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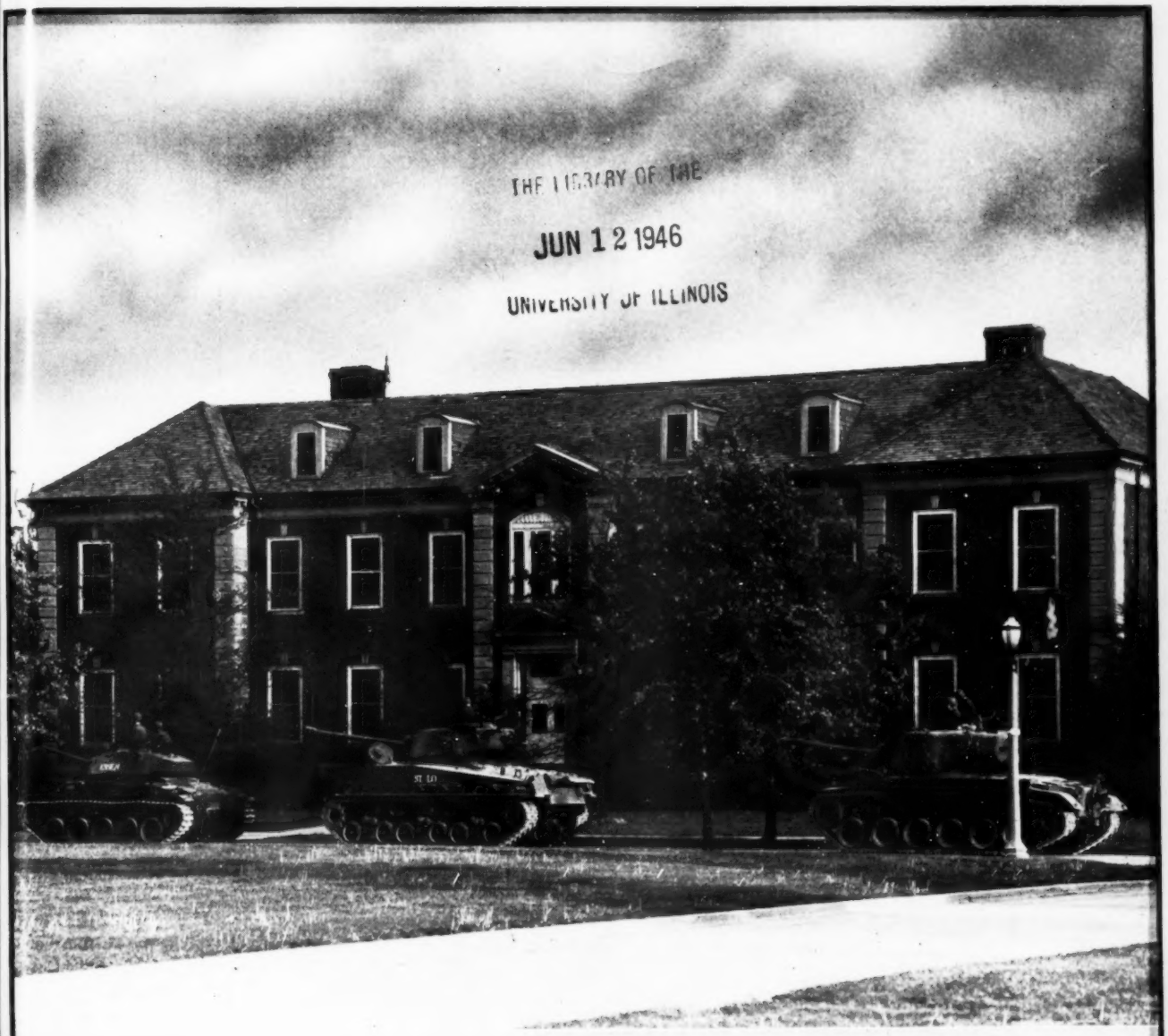
THE CAVALRY JOURNAL



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Tanks pictured are, left to right, M24 light, M4 A3 E8 medium, and M26 heavy

MAY-JUNE, 1946

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A CAVALRY GROUP WITH AN ARMORED DIVISION

by Captain Alan R. Probst

Abridged from the official, after-action reports of the 101st Cavalry Group (Mecz).

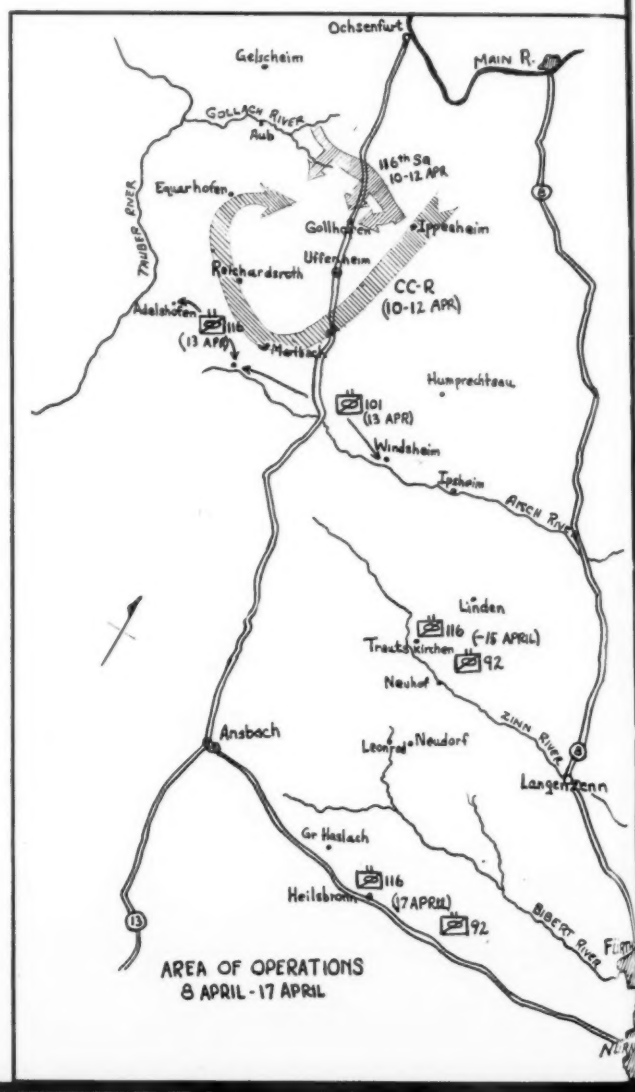
IN an area offering adequate road nets, a cavalry group and an armored division can operate together over a relatively wide front to mutual advantage. So long as sufficient road space is available, the group can operate along the flanks and to the front of the division, developing the contour of enemy centers of resistance, providing security, mopping up between the prongs of the combat commands. In such a situation, the group is given the opportunity to utilize to the utmost its characteristic mobility. Provided with a suitable attachment of other arms it becomes an additional task force, extending the area of operations of the division.

This article describes the operations of the 101st Cavalry Group (Mecz), Colonel Charles B. McClelland commanding, while attached to the 12th Armored Division, commanded by Major General Roderick R. Allen. In abridging the official report, three typical periods of operation have been covered in some detail. Locations of command posts have been deleted, and certain other data necessary to official reports, such as numbers, dates, and times of Operation Instructions have been eliminated in order to permit concentration on the manner in which operations developed. Because this is an account of Group action, the operations of major subordinate units are described, and little detailed account is given-of the exploits of individual units.

Just prior to attachment of the Group to the 12th Armored Division, both units had been operating on the right flank of the XXI Corps, which was driving across Germany east of the Rhine to seize Wurzburg and the crossings over the Main River to the south of the city. Both units were located south of the southernmost loop of the Main in the open, rolling terrain below Wurzburg. At the time the attachment was made on April 8, the Group was composed of Group Headquarters, the 101st Squadron, with Lieutenant Colonel Milton Kendall, commanding, and the 116th Squadron, with Lieutenant Colonel Hubert C. Leonard commanding. The offensive operations which followed developed into a pursuit of the rapidly crumbling enemy forces which led rapidly south to the passes into the much-touted "National Redoubt" in the Alps.

Initial Mission

The initial mission of the Group was to conduct a reconnaissance in force to the northeast in a zone approximately 30 kilometers in width, to a limiting line on the high ground southeast of the Aisch River. The 92d Cavalry Reconnaissance Squadron (Mecz), integral reconnaissance unit of the 12th Armored Division,



was given a contiguous zone to the left of the Group. The Group was reinforced by the attachment of one company of medium tanks, and the 495th AFA Bn was placed in direct support. The medium tanks were further attached to the squadrons and the Group moved forward, squadrons abreast, with the 101st Squadron on the right. Resistance was very determined. By nightfall the 101st Squadron had reached the Tauber and Gollach rivers in its zone. The 116th Squadron was approximately three kilometers short of the Gollach in its zone.

Both squadrons continued pressure during April 9. Enemy resistance was well defined along the Gollach River. As a result of the information gained, the Division launched two combat commands in simultaneous encircling movements, CC-R attacking south and southwest in the Group zone, and CC-B in a similar maneuver in the zone of the 92d Squadron. The 101st Squadron was assembled prepared to follow CC-R through the gap created and continue the reconnaissance mission to the limiting line as the Combat Command turned west and northwest in its encircling move.

Counterattacks at two points in the 116th Squadron zone were beaten off during the night of April 9-10. The CCs jumped off in the morning, and CC-R advanced approximately three kilometers in heavy fighting during the day. The attack was renewed the next morning, the Combat Command still moving forward slowly as the enemy defended stubbornly from every vantage point. The 116th Squadron maintained pressure against the enemy confronting it but made no appreciable gains. In the afternoon a task force of Troop C, 116th Squadron, one platoon of medium tanks, one platoon each of light tanks and assault guns, attacked from the northwest to clear Gollhofen, a strongly held town which was blocking the principal north-south road through the Group zone. Another task force—composed of Company F, 101st Squadron, one platoon of Troop B, one platoon of medium tanks, and two platoons of Troop E, 101st Squadron—attacked from the northeast. The forces succeeded in fighting their way into the town in the late afternoon, but were unable to hold their positions and pulled back before dark.

During the night the enemy made a tank attack against the Command Post of the 101st Squadron. It was beaten off without serious losses. At dawn the CP area was strafed and bombed by enemy jet-propelled planes. CC-R continued its attack and broke the core of enemy resistance confronting it. The Combat Command moved rapidly south, with the 101st Squadron covering its left flank until it turned west and northwest in the encircling move. The Squadron continued east on the reconnaissance mission against continued resistance. By nightfall the Squadron had reached a line roughly three kilometers from the west banks of the Aisch River.

In continued pressure throughout the day, the 116th Squadron reached the Gollach River line in its zone. At 1530 liaison was effected with elements of CC-R, and the two units continued pressure on the forces pocketed. The eastern end of the pocket could not be closed, however, and OPs reported considerable movement of enemy vehicles in that direction. During the night, artillery fire was laid down with good effect.

Early April 13 both squadrons again moved forward, the 116th Squadron moving rapidly south and east until strong opposition developed along the Aisch River and progress was halted. The 101st Squadron continued in its zone against heavy resistance. The Squadron command element and reserve were attacked in force about midday by infantry, self-propelled guns, and tanks. The attack was beaten off and heavy casualties were suffered by the enemy infantry. One Mark IV tank and four self-propelled guns were destroyed. By nightfall the Squadron had reached the Aisch River in its zone.

In the course of this operation, the Group reconnoitered a zone approximately 30 kilometers in width to a depth of 25 kilometers in the face of determined enemy resistance, outlined the enemy's MLR along the Aisch River, inflicted heavy casualties in both men and matériel and captured 384 prisoners. Late April 13 the 101st Squadron was attached to the 4th Infantry Division, effective April 14, and remained with that unit until April 19.

The Turn to the South

In the next series of operations, the direction of effort swung more to the south, as corps and army boundaries were affected by the operations of other units coming down from the north. On April 14 all Division units were alerted to exploit on three hours notice in a zone roughly 30 kilometers in width. Bounded on the northeast and southwest by Highways 8 and 13 respectively, the zone by-passed Nurnberg to the southwest to an objective line roughly 30 kilometers south and southwest of that city. The Division was to move in two columns with axes along the highways at the flanks of the zone. The Group was reinforced by attachment of the 92d Squadron (less two troops), the 342d AFA Battalion, and two platoons of medium tanks, and was directed to move in the zone between the axes of the combat commands to the objective line. Upon reaching the line, the Group was to be prepared to continue the attack to the southeast, or to attack to the north or south on Division order. All elements were directed to report their arrival on Division Phase Line No. 1, the Ansbach-Nurnberg road.

Again the Group disposition was squadrons abreast, with the 116th on the right and the 92d Squadron on the left. The main effort of both Squadrons was directed toward the center of the Group zone. The 116th Squadron displaced east to reach its new zone. The Aisch River was reached without incident. All bridges having been destroyed, the Squadron located a ford and expedited repair of a bridge. Once across the river, reconnaissance was pushed forward to the high wooded ground southeast of the river, where determined resistance was met. As there was no suitable crossing in

the zone of the 92d Squadron, Troops A and D crossed in the zone of the 116th Squadron, and also advanced to the high ground. The enemy counterattacked during the crossing. One of his tanks was destroyed and two damaged, and the attack was repelled.

Early April 15 both Squadrons resumed the attack. At about 1300 the 92d Squadron pushed through in its zone and by nightfall had advanced to the Zinn River. The 116th Squadron was unable to overcome the enemy in its zone, and at 1700 disengaged and passed through the gap opened by the 92d Squadron. The 116th Squadron then moved southeast against light resistance, and by nightfall had reached the Zinn River in zone.

On April 16 the 116th Squadron, unable to find a crossing in its zone, cleared a bridgehead and covered the construction of a treadway bridge at Trautskirchen. The Squadron crossed in the afternoon, seized two towns south of the river, and knocked out several defended roadblocks. At dusk an enemy column marching toward Neudorf, the last town taken, was surprised and dispersed with heavy casualties by artillery and small-arms fire.

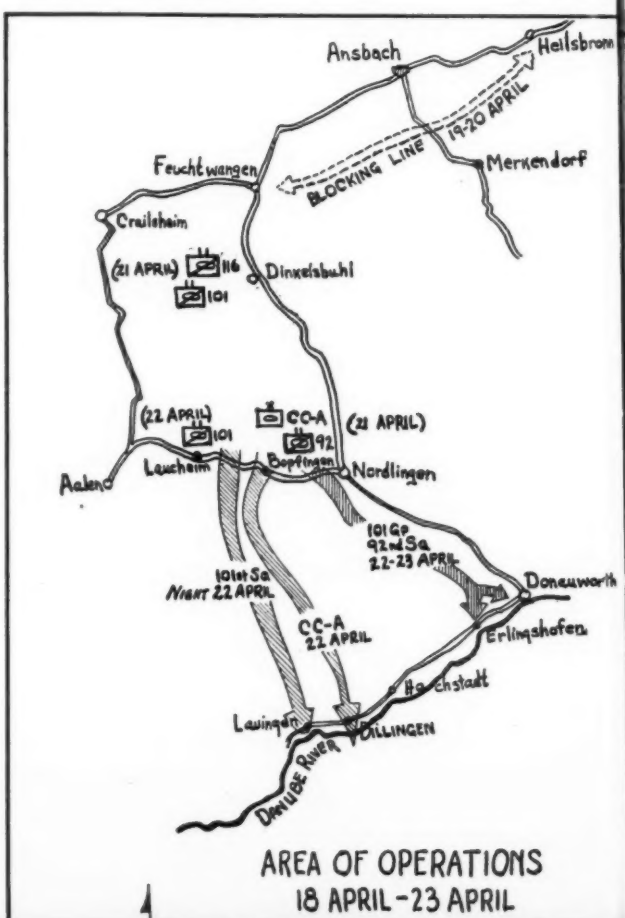
The 92d Squadron in its area at Neuhof found a bridge which had been prepared for demolition, and was blocked by fallen trees and strongly defended, but was still intact. After an all-day battle, the bridge was seized and the demolitions and trees were cleared. The Squadron crossed in force at 1800, seized and cleared the town, and outposted it for the night.

During April 17 both Squadrons advanced against disintegrating resistance. Over the Bibert River, undefended crossings were found that were close to crossings that were hotly defended. By nightfall both squadrons had reached and outposted the Ansbach-Nurnberg highway in zone. During the four days' operations, the Group had advanced 43 kilometers in covering the zone between the two columns of the Division. In addition to casualties inflicted on the enemy, 332 prisoners were captured.

On April 18 the direction of the Division attack was turned southwest along the axis Ansbach-Feuchtwangen-Crailsheim. CC-B was directed to seize Feuchtwangen, CC-A to follow and secure Ansbach. The Group was directed to move south and west by all available routes, and to protect the left flank of CC-B, and assist in the attack on Feuchtwangen. Squadron axes were prescribed so that the Group would be brought southwest to an objective line extending south four to eight kilometers from Feuchtwangen. The Group met resistance almost immediately upon moving out. Both Squadrons pushed south and west against a series of delaying actions. At 2000, Troop C, 92d Squadron, reached the main north-south highway south of Ansbach and surprised an enemy column en route toward Ansbach. Artillery and assault gun fire were placed immediately and with good effect, and the troop consolidated its position along the highway.

Troop C, 116th Squadron, one platoon each of Company F and Troop E attached reached Merkendorf, farther south along the same highway, and fought its way into the town. Elements of both 17th SS Panzer Grenadier Division and the SS Totenkopf Division were driven from the town, and they assumed new defensive positions approximately one kilometer east and southeast of the town. At about 0430, April 19, the SS troops counterattacked, striking simultaneously from the east, south, and northeast. After a two-hour series of hand-to-hand engagements, the fanatic assaults of the attackers were repulsed. The troop reorganized at daylight in time to break up an attempt to reinforce the enemy still in the town. Eighty of the SS troopers who participated in the initial attack were killed, 16 captured, and an undetermined number wounded. The troop and attached units suffered casualties of two killed, 10 wounded, and seven missing, and several vehicles destroyed. Of the seven missing, two later escaped their captors and returned to their unit.

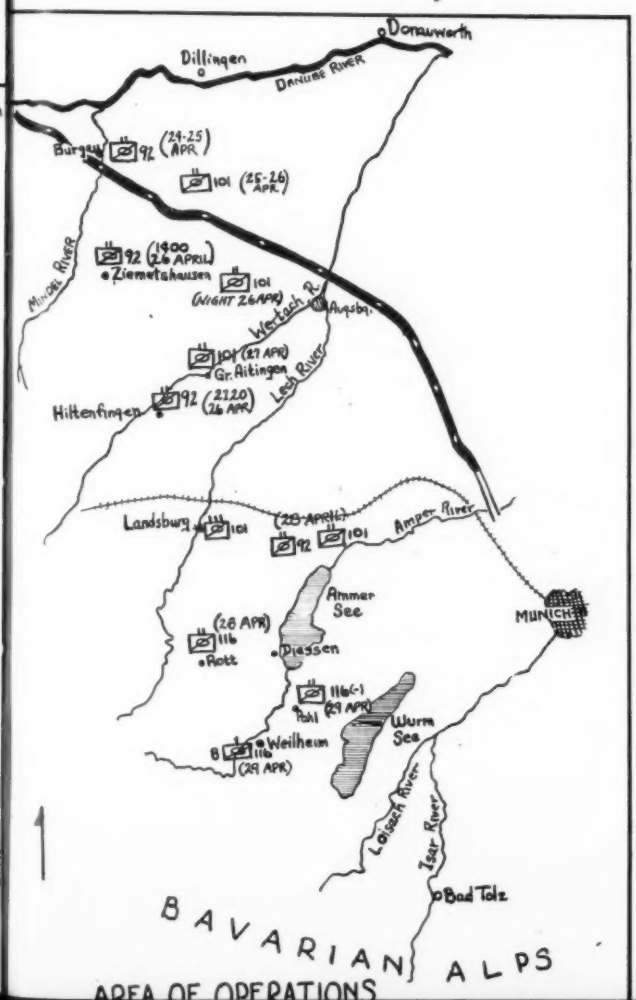
During the night of April 18-19, instructions were received that XV Corps had been given responsibility for Nurnberg. The direction of the Division attack was turned south at Feuchtwangen and the new Division axis was to pass through Lauchheim on the Aalen-Nordlingen highway. The Group was directed to block along a 50-kilometer line extending from near Feuchtwangen east and north to Heilsbronn on the Ansbach-Nurnberg highway, and to maintain contact between the 12th Armored Division and the 42d Infantry Division, of the XV Corps.



AREA OF OPERATIONS
18 APRIL - 23 APRIL

The 101st Squadron was relieved from attachment to the 4th Infantry Division and returned to the Group at 1400, April 19. During April 19 the three squadrons moved into assigned positions in the protective screen, while the Division turned in its new direction. On April 20, the Group was relieved of its blocking mission, and directed to reconnoiter to the south in the Division zone. Initially, the 101st Squadron covered the entire zone until the 92d Squadron could move south and west from its blocking positions. The 116th Squadron was held in Group reserve. A further modification of Division plans on April 20 sent CC-A to the south in two columns. The 92d Squadron was directed to operate in the area between the columns. Progress was fairly rapid during the day, but slowed in the afternoon as resistance became more determined. By nightfall CC-A and the 92d Squadron were approximately three kilometers short of the objective line along the Aalen-Nordlingen highway.

The 101st Squadron, operating in the area between the westernmost column of CC-A and the Division's west boundary, found progress more difficult. At nightfall it was in position west of Dinkelsbuhl and was maintaining contact with enemy forces in the wooded areas to the south. The 116th Squadron was assembled in the 101st Squadron area.



Late April 23, orders were issued for the seizure of crossings over the Danube River between Donauworth and Gundelfingen. CC-A was to continue to the south and seize crossings in the Dillingen area. CC-B, after assisting the 92d Squadron to clear the enemy confronting it, was to seize crossings in the Hockstadt area. CC-R was given the mission of blocking to the east on the Aalen-Nordlingen highway. The Group was directed to send one squadron south along the Division left flank and to seize crossings in the Tapfheim-Erlingshofen area. The other squadrons were to mop up resistance in the wake of the CCs and the advance squadron.

The 92d Squadron was designated to seize the crossings over the Danube; the 101st, to move south and clean up enemy resistance along the Aalen-Nordlingen highway in the western portion of the Division zone; the 116th, to mop up resistance remaining in the area by-passed by the 101st Squadron.

The 92d Squadron moved south early April 22 against very strong resistance. By nightfall the Squadron had reached the Eger River in zone but was prevented from crossing by fierce resistance from the south bank. The 116th Squadron cleared the enemy in its area and again assembled in reserve. The 101st Squadron, assisted by CC-R, cleared up its area. CC-A thrust through the hill masses to Dillingen and seized the bridge over the Danube intact, and established a limited bridgehead on the south bank. At dark April 22, the 101st Squadron was directed by the CO, 101st Group, to move south immediately and seize Danube River crossings in the Lauingen area west of Dillingen. After a bold, night march the Squadron seized and occupied Lauingen by 2330. The enemy, however, had destroyed all bridges over the Danube before they could be taken.

While CC-A and the 101st Squadron consolidated in their areas April 23, the 92d Squadron crossed the Eger River and proceeded south. The enemy resisted strongly at the entrances to the Danube River plain. Artillery fire was placed on the retreating enemy columns with good effect, and after prolonged fighting, the 92d Squadron reached the river area—but the enemy had been able to blow all bridges before they could be seized. CC-B reached Hockstadt, but likewise was unable to seize bridges before they were destroyed. The Dillingen bridge remained the only intact crossing in the Division area.

South of the Danube

During the period April 23-25 operations were concerned with protection of the flanks of the Division, and the extension of the bridgehead area. The 92d Squadron crossed to the south bank and reconnoitered to the south and southwest, and seized bridges over the Mindel River at Burgau and on the autobahn south of Burgau, which facilitated the movement of CC-B along the south bank of the river. Considerable enemy activity was observed on the wooded heights west of Burgau.

The 42d Infantry Division reached the Danube on

the Division's left and took Donauworth. The 63d Infantry Division reached and crossed the Danube on the Division's right. During the night April 25-26, the enemy counterattacked the 63d Division bridgehead in force. The 92d Squadron held its bridges throughout the night, and fought off a sharp counterattack at Burgau the next day. The other squadrons of the Group, and Group Headquarters, crossed and assembled on the south bank. The Group was directed to extend reconnaissance to the south.

While constantly probing at the enemy positions in its area the 92d Squadron found a gap in the defenses on the east bank of the Mindel River. Routes farther east were held in force, and the enemy on the west bank of the Mindel in the vicinity of Burgau were sticking firmly to their positions. The 116th Squadron relieved the 92d at the Mindel River bridges, and the 92d raced south along the east bank of the Mindel for about 15 kilometers and then turned east behind the enemy MLR, and assembled at Ziemetshausen. At 1400 a combat patrol from the 92d Squadron, operating east of Ziemetshausen, intercepted a German officer courier from the 13th SS Corps. Among the top secret documents captured was a marked map showing enemy operations for April 26. The map showed that three divisions had been committed to the attack of the 63d Division bridgehead, and that a fourth division was defending in the Group zone. The Mindel River was marked as the boundary between adjacent Corps. Confusion as to responsibility for the defense of that corridor had apparently resulted in the gap found by the 92d Squadron. (The map and other documents captured were promptly forwarded to 12th Armored Division headquarters.)

In exploit of its success, the 92d Squadron was directed to continue south and seize crossings over the Wertach River at Hiltenfingen and Siebnach. Overcoming strong rear area defenses, the Squadron raced to the Wertach and took intact the bridge near Hiltenfingen at 2000. By 2120 the town and two additional bridges over smaller streams were secured.

The 101st Squadron, moving south in its zone to the left of the 92d, battled its way through wooded areas, finding enemy resistance extremely determined. The Squadron crossed the Augsberg-Ulm autobahn and continued its advance throughout the night, having been directed to seize bridges in the area of Gross Aitingen on the Wertach River. The 116th Squadron mopped up resistance in the area between the Mindel valley and the 101st Squadron zone, and captured a large quantity of airplanes, and an underground airplane parts factory. The Squadron then moved south during the night to assist the 92d Squadron at the bridgehead over the Wertach. CC-A also moved south that night to relieve elements of the Group at the bridgehead. Just before daylight April 27, CC-A arrived at the Wertach. The Group was directed to proceed south with all available troops and seize crossings over the Lech River. The CO of the 101st Group assigned the bridges in the vicinity of Landsberg to the 92d Squadron, and those in the vicinity of Schwabstadl to the 116th Squadron. All bridges over the Lech in zone were found to have been destroyed, and both squadrons made a detailed reconnaissance of the west bank and recommended the repair of bridges and of sites suitable for the construction of new bridges. Meanwhile, the 101st Squadron continued to move south and at midday seized intact the Wertach River bridge at Gross Aitingen.

The Division then was given the mission of continuing southeast to seize and hold Weilheim and Bad Tolz, and deny the enemy the use of passes into the Bavarian Alps in that area. Large enemy concentrations had been reported in Munich and vicinity. The plan directed CC-A—preceded by a squadron of cavalry—to block the passes south of Weilheim and Pennsberg; CC-B to block the passes south of Bad Tolz. The remainder of the Group was to advance to the east and southeast, block exits from Munich in that direction, and protect the Division left flank. The 116th Squadron was assigned to the mission with CC-A, and the blocking line was divided between the 92d and 101st Squadrons.

A partially destroyed railroad bridge near Landsberg was repaired during the night of April 27-28 by Division engineers. The 116th Squadron began crossing at 0600 April 28, against scattered small-arms fire and unobserved artillery fire. The Squadron made good progress through Landsberg, and to a point about 20 kilometers southeast (approximately halfway to Weilheim) where stiff opposition was encountered. Attempts to bypass were unsuccessful and forward movement was halted at dark. During the night, elements of the squadron moved east by secondary roads to the vicinity of the Ammer See.

Followed by the 92d Squadron, the 101st Squadron crossed the bridge after the 116th, and moved east on its mission. Poor roads and demolitions forced the Squadron to detour to the south and return north along the west bank of the Ammer See, with the intention of securing and using the causeway across the northern tip of the See. Progress was delayed by an enemy attack in which were employed four Tiger Tanks and a substantial number of infantry. At dusk, as forward elements of the squadron were approaching the causeway, the enemy detonated prepared charges and literally blew up the road in the faces of the advancing units. The Squadron deployed and outposted the Amper River line for the night. The 92d Squadron did not complete the crossing until late April 28, because of delays in the crossings of the other two Squadrons and the continuous delays for bridge repairs. The crossing finally completed, the Squadron moved east and assembled in support of the 101st Squadron.

Early April 29, Troop A, 116th Squadron, moved around the southern tip of the Ammer See and reached the main highway that joined Diessen and Weilheim. The troop raced east, and from a surprised enemy captured the bridges over the Ammer River. Troop B advanced through the opposition along the original route,

captured the bridge over the Ammer River at the western edge of Weilheim, and at 1100 secured the town. In the meantime, the rest of the Squadron fought against resistance along the alternate route taken by Troop A. CC-A, which had crossed the bridge during the night, began entering Weilheim at 1130.

That afternoon the mission of CC-A and the 116th Squadron was changed: they were to move through the mountain passes south of Weilheim and secure Innsbruck. Since the bulk of the Squadron was being delayed by the fighting north of Weilheim, Troop B, already in Weilheim, was detached from the Squadron and attached to CC-A in order to avoid delay. The force moved out at once and before dark had progressed about 20 kilometers south against varying resistance. The mission was cancelled the following day and Troop B later rejoined the Squadron.

Within the next few days, the operation plans were modified by the changing situation, and by the arrival from the north of other friendly units. Before being relieved from attachment to the 12th Armored Division on May 4 units of the Group conducted an intensive reconnaissance of the water barriers in the area east of Weilheim, and performed patrol and security missions for the Division.

During the course of the long drive south from the Danube, the Group, operating with three squadrons, had found the gap in the defenses south of the Danube and poured south, extending the area of operations of the Division from Dillingen to Landsberg and thence to Weilheim—an advance of roughly 130 kilometers. Several important bridges were seized intact, and were held until they were taken over by the rapidly advancing units of the Division. Security was provided for the Division flanks, enemy supply and communication routes disrupted, and large quantities of matériel captured or destroyed.

During this latter phase in which the attack developed into an extended pursuit, the Group was able to use the mobility inherent in mechanized cavalry to excellent advantage. The rapidity with which the armored units arrived at each vital point allowed the Group to maintain the momentum of its continuous thrust and to keep the enemy off-balance.

To Newly Organizing Armored Divisions and Mechanized Cavalry Unit Associations

Many armored divisions and mechanized cavalry units today are forming associations.

To those who have already formed such associations—and to those who are contemplating the formation of such organizations in the future—THE CAVALRY JOURNAL wishes to offer its services. The facilities of the magazine are open, without charge, to publicize the activities or any other matters which the associations desire to bring to the attention of our readers.

We would be very glad to publish the name of each new association as it is formed, with the address of its headquarters or officials, which, we believe, will help with the establishment of the associations.

Write to THE CAVALRY JOURNAL, 1719 K Street N.W., Washington 6, D. C., if we can be of any assistance.

The 316th Provisional Mechanized Cavalry Brigade in Combat

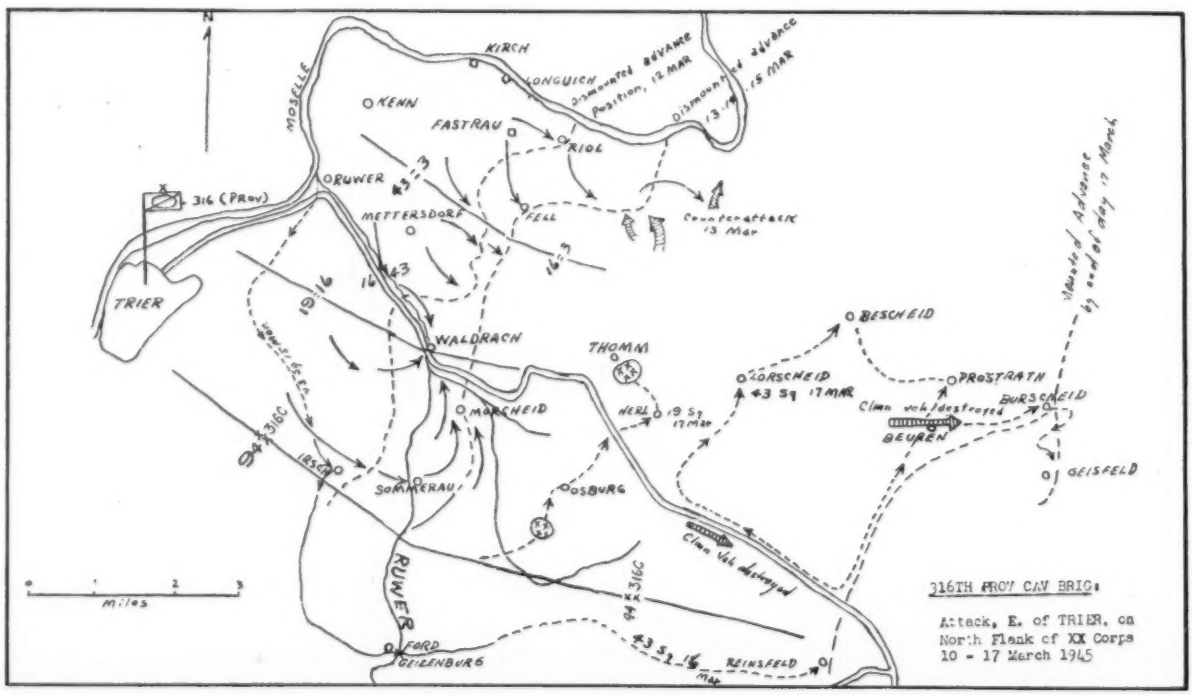
FIRST OF A SERIES

ON March 8, 1945, the 3d Cavalry Group of the XX Corps, composed of the 3d and 43d Cavalry Reconnaissance Squadrons, was in the area south of the Moselle River just east of Trier. It was in the process of taking over the positions held by the 417th Infantry Regiment. For several days it was occupied mainly in securing a suitable line of departure for participating in an offensive operation being prepared by the corps.

In order to assemble the 94th Infantry Division in preparation for this offensive, XX Corps was obliged to leave a wide gap between its left (north) flank and the XII Corps, then north of the Moselle River. Mechanized cavalry was the ideal arm with which to fill the gap and to conduct an offensive in this zone. To augment the mechanized cavalry strength of the corps in preparation for such an operation, therefore, Third Army attached to the XX Corps an additional group, the 16th, composed of the 16th and 19th Cavalry Reconnaissance Squadrons. This group had had no previous combat experience, and so in order to insure coördination of the mechanized cavalry effort, the corps commander decided to form a provisional cavalry brigade for the execution of this mission, and to give it the experienced leadership of Colonel James H. Polk, commanding officer of the 3d Cavalry Group. Accordingly, by corps order of March 9, the 316th Provisional Cavalry Brigade, comprising the 3d and 16th Cavalry Groups, was constituted. Also attached to the brigade were the 241st Field Artillery Battalion, the 245th Engineer Combat Battalion, Company A 818th Tank Destroyer Battalion (SP), and an air support party. The 416th Field Artillery Group was to be in direct support, and the 558th Field Artillery Battalion in general support.

The brigade's mission was to attack in conjunction with the corps, to protect the XX Corps' north flank, and to maintain contact with the 94th Infantry Division on the south. The projected date for the attack was March 13.

Upon its arrival from Veckering on March 12, the 16th Cavalry Group was given the mission of taking over the right of the brigade's sector from the 43d Cavalry Reconnaissance Squadron, and of maintaining contact with the 94th Infantry Division. Accordingly, on the day before the attack, the brigade was disposed with cavalry groups abreast, the 16th Cavalry Group on the right. In each group, squadrons were disposed abreast, so that the brigade front was, in order from right to left: the 16th and 19th cavalry reconnaissance squadrons, from a draw on the south (the north boundary of the zone of action of the 94th Infantry Division), north



to the Ruwer River; and the 43d and 3d cavalry reconnaissance squadrons from the Ruwer River north to the Moselle River. The width of the front was approximately seven miles.

The primarily dismounted phase of the attack began March 13 and continued through March 15. As it progressed, the 43d Cavalry Reconnaissance Squadron was pinched out and passed into brigade reserve; its sector was taken over by the 16th Cavalry Reconnaissance Squadron. When the advance reached the Ruwer River, all bridges were found destroyed. The 94th Infantry Division, however, discovered a ford near Geizburg, and on March 14-15 the 19th Cavalry Reconnaissance Squadron sent tanks across to support its dismounted attack on Sommerau and Morcheid. On March 16-17, when the 94th Infantry Division had taken Reinsfeld, the 43d Cavalry Reconnaissance Squadron was sent mounted across the ford to attack north from that point. By the end of March 17, it had advanced as far north and east as Burtscheid.

The terrain in the brigade's zone of action, in the foothills of the Hunnsbruck Mountains, was found difficult for mechanized cavalry operations. The streams and high, heavily wooded ridges ran generally north and south, perpendicular to the direction of advance. The enemy's defensive and delaying tactics were therefore favored, and he was afforded excellent observation posts for directing artillery fire.

In the attack, the main effort was invariably made with the cavalry reconnaissance troops advancing dismounted, closely supported by the light tanks, tank destroyers and engineers. The light tanks and tank destroyers were brought up in defilade and supported the attack with fire, or stood by for use in the assault. The engineers attached to the cavalry troops were employed to remove road blocks and to clear the minefields. The assault guns were generally employed in battery in close support of the attack; and through the air support party, attacks by light bombers were arranged against enemy-occupied towns prior to their assault by the mechanized cavalry.

In the assault, mechanized cavalrymen, mounted on tanks, were employed in the same manner as tank-infantry teams. When a town or high ground was seized, it was immediately organized for all-round defense. As the roads were opened by the capture of the towns and high ground along their routes, the mechanized cavalry troops sent out rapidly moving mounted teams to cut off and harass the retreating enemy.

On March 18, after the corps offensive had been successful, and the enemy had started a withdrawal along the entire front, the provisional cavalry brigade was dissolved. The 3d Cavalry Group, which had been committed without rest for more than three months, was withdrawn to Trier in SHAEF reserve, and the 16th Cavalry Group assumed full responsibility in the zone.

Thus, over a period of eight days, a mechanized cavalry brigade had fought on a seven-mile front against stiff opposition and over difficult terrain, and had advanced 10 miles while inflicting many enemy casualties. An important road that ran through the zone had been opened, and the way had been cleared for a combat command of the 12th Armored Division to exploit the 94th Infantry Division's attack.

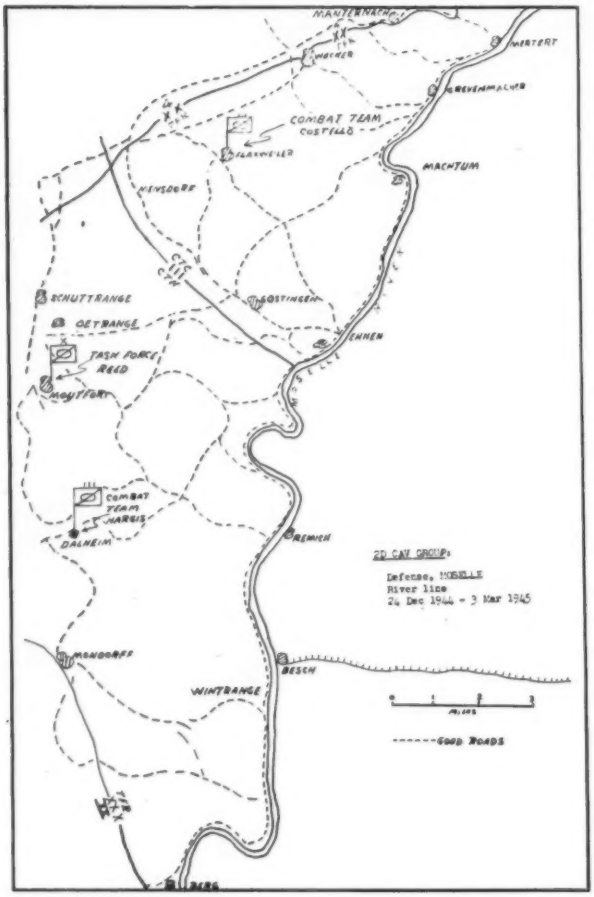
The 2d Cavalry Group

Defense of the west bank of the Moselle River, in the Mountfort Area, Luxembourg, December 24, 1944–March 3, 1945.

ON December 23, 1944, the 2d Cavalry Group received the mission of protecting the right (east) flank of XII Corps along the west bank of the Moselle River in an area from Haute Kontz on the south to Mertert on the north. All enemy pockets on the west bank of the Moselle were to be reduced and the enemy held east of the Moselle within the sector. Contact was to be gained and maintained with XX Corps on the right and with the 4th Infantry Division on the left along a front of 25 miles. In this sector, the Moselle River was from 500 to 600 feet wide and up to 25 feet deep. On the west bank, the hills rose steeply to a height of 450 meters; on the east bank, the slope was gradual. This bank was known to be held by enemy infantry and fortress machine-gun battalions which were generally unaggressive except for patrols. Two enemy bridgeheads existed within the sector on the west bank, one at Machtum and the other at Mertert. There was also an enemy bridgehead at Wasserbillig, two kilometers from the north boundary of the sector.

The corps commander constituted the group as Task Force Reed, and he attached to it the following units: 372d and 398th Engineer (GS) Regiments, 808th Tank Destroyer Battalion (3-inch, towed), 255th Field Artillery Battalion (105mm howitzer), 276th Armored Field Artillery Battalion, and one signal platoon. The engineer regiments were to be used as infantry. For execution of the mission, the task force was disposed as follows (see

sketch): Combat Team Hargis, comprising the 42d Cavalry Reconnaissance Squadron (less Troop E and Company F), one battalion of the 372d Engineer (GS) Regiment, and one tank destroyer company, on the right; Combat Team Costello, comprising the 2d Cavalry Reconnaissance Squadron (less Troop E), 398th Engineer (GS) Regiment, and one tank destroyer company, on the left. The remainder of the force was to be in reserve at Mountfort.



Three defensive lines were organized as follows: an outpost line, held by 11 platoons, on the riverbank; a support line, manned by 18 platoons, along the hills from 1,000 to 2,000 yards west of the river; and a reserve line, not occupied, on the commanding ground two to three miles from the Moselle River. Numerous obstacles were erected, fires were carefully prepared, and an elaborate communications system was established.

Aggressive patrolling into the Mertert and Machtum bridgeheads was initiated immediately and resulted in the withdrawal across the river of the force at Mertert. A dismounted attack that was supported by tanks drove the enemy from the high ground adjacent to Machtum on December 30. On January 11, Troop C of the 2d Cavalry Reconnaissance Squadron attacked dismounted and, after 12 hours of street fighting, cleared the town. Patrolling across the Moselle River was also undertaken, and on February 19, an offensive operation was executed east of the river. Supporting artillery, with the assault gun troops attached, was active day and night. It was possible to rotate organizations frequently, and health and morale remained excellent.

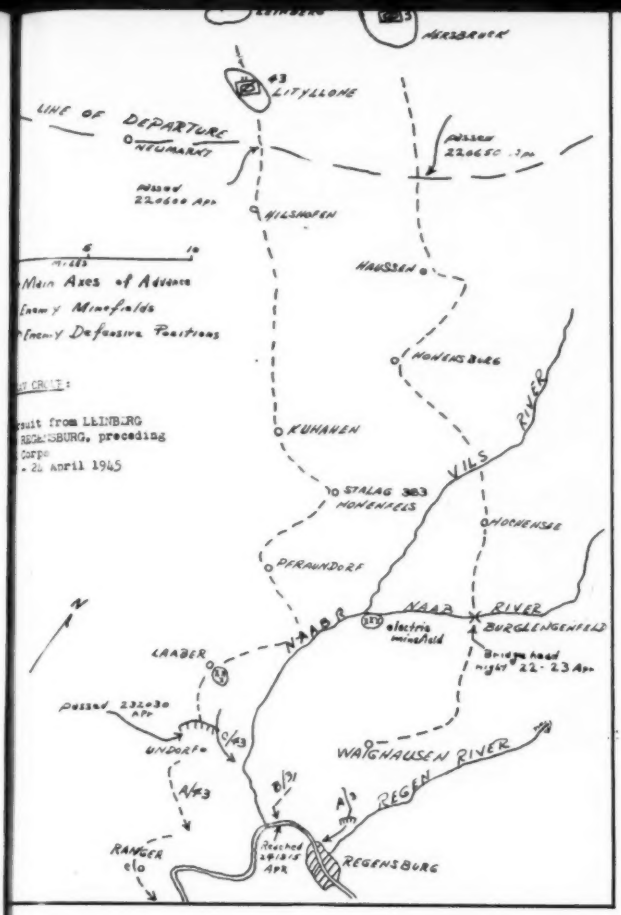
To summarize this operation of the 2d Cavalry Group: a force of some 5,500 successfully defended a front of over 25 miles for more than two months, thus releasing an infantry division for offensive combat; mechanized cavalry, with its mobility and excellent communications, demonstrated its suitability to defend long river lines, with infantry, artillery and engineer support.

The 3d Cavalry Group

Pursuit from Leinberg to Regensburg, preceding the XX Corps, to seize crossings over the Danube River, April 22-24, 1945.

ON April 21, 1945, the 3d Cavalry Group, composed of the 3d and 43d cavalry reconnaissance squadrons, was disposed as shown on the accompanying sketch. The mission then assigned to XX Corps, to which the group was attached, was to begin an advance southeast in assigned zone early on April 22, and to make contact with Soviet Army troops which were reported moving west from Vienna. The 3d Cavalry Group, with Companies A and C, 811th Tank Destroyer Battalion (SP), Company A, 245th Engineer (C) Battalion, and the 5th Ranger Battalion, attached, and with the 274th Armored Field Artillery Battalion in direct support, was given the mission to pursue vigorously the routed German forces southeast to Regensburg, and to seize and hold the bridges across the Danube River in the corps' zone. The group was to be followed by the 65th and 71st Infantry Divisions, advancing abreast, with the 65th on the right.

The group commander decided to move with squadrons abreast, the 43d on the right. The Vils River when



reached was to become the boundary between squadrons. Isolated enemy centers of resistance were to be reported and by-passed, and organized enemy defensive positions were to be developed. The 43d Cavalry Reconnaissance Squadron—with three companies of the 5th Ranger Battalion, Company C 811th Tank Destroyer Battalion (SP), and one platoon of Company A 245th Engineers (C) attached, and with one battery of the 274th Armored Field Artillery Battalion in direct support—was to pursue in its zone, and maintain contact with the 65th Infantry Division, which was to follow. The 3d Cavalry Reconnaissance Squadron, on the left—with the 5th Ranger Battalion (less three companies), Company A 811th Tank Destroyer Battalion (SP), and Company A (less one platoon) 245th Engineer (C) Battalion, attached, and with the 274th Armored Field Artillery Battalion (less one battery) in direct support—was to pursue in its zone and to maintain contact with the 71st Infantry Division, following in its rear, and was to seize and hold all bridges over the Naab River found intact, Group headquarters was to move with the west column.

At 0600 hours April 22, the advance began. The weather was cloudy and cold, and there was rain and snow. The terrain was mountainous and wooded, and the roads muddy and occasionally, although shown on the map, nonexistent. The advance was slowed by road blocks and minefields, a great many of which were defended by small arms and automatic weapons and in some instances were supported by the antitank fire from 20mm and 88mm guns.

The 43d Cavalry Reconnaissance Squadron encountered one organized enemy defensive position, which it developed and penetrated. It also overran a German Stalag and released over 2,000 Allied prisoners of war. The 3d Cavalry Reconnaissance Squadron seized a bridge across the Naab River and held it until the Infantry came up 24 hours later and relieved it. By the afternoon of the third day, both squadrons had reached their objective, the Danube River. Approximately 2,000 POWs had been taken and an unknown number of casualties inflicted on the enemy.

The following were the principal results of this operation: the enemy was routed before he could organize a defensive stand north of the Danube; the seizure of the bridge across the Naab River assisted the advance of the left division; and the operation set the stage for XX Corps' assault on Regensburg.

The 4th Cavalry Group

Screening the VII Corps' right flank, south of Aachen, September 16–October 2, 1944.

ON September 15, 1944, the 4th Cavalry Group, composed of the 4th and 24th cavalry reconnaissance squadrons—with the 759th Light Battalion (less Company A), the 87th Armored Field Artillery Battalion, the 635th Tank Destroyer Battalion (3-inch, towed) and Companies A and C of the 297th Engineer (C) Battalion attached—was given the mission of screening the right (south) flank of the VII Corps in its attack on the Siegfried Line near Aachen.

On September 16, the group, with squadrons abreast, was disposed as follows (see sketch): the 24th Cavalry Reconnaissance Squadron was on the right, with an engineer platoon attached, and one light tank company in direct support; the 4th Cavalry Reconnaissance Squadron was on the left, with an engineer company and a treadway bridge detachment attached; the 87th Armored Field Artillery Battalion was in position just west of Bullingen, in direct support of both squadrons.

Group headquarters and the remainder of the force were in Butgenbach.

The terrain south of Aachen was hilly and densely wooded. The weather was cold, and there were heavy fogs in the late evening and in the early morning. Because enemy fortifications and the extremely dense woods made vehicular movement impracticable, the group commander directed that both squadrons send out aggressive dismounted patrols to the east.

These patrols on the first day encountered the outer fringes of the Siegfried Line. The defenses consisted of road blocks, sited in depth, and in most cases booby-trapped and covered by small-arms fire. Numerous enemy patrols were working in the surrounding woods. The cavalry patrols were accompanied by elements of the attached engineers which removed the booby traps, and reduced the road blocks after they were captured. One company of light tanks was used to patrol the road between Butgenbach and Kalterherberg.

On September 17, the 4th Cavalry Reconnaissance Squadron repulsed an enemy counterattack by an estimated 100 infantrymen, and on September 18—when the sector was enlarged to a width of 12 to 15 miles to include the towns of Hofen and Alzen—the 24th Cavalry Reconnaissance Squadron also repulsed a counterattack by a company of infantry. Cavalry patrols were successful in locating enemy defensive positions, and through these efforts a valuable file of enemy information was compiled.

The roving tanks played an important rôle in denying enemy patrols entry through the gaps which existed on the wide front. Furthermore, the deception created through the continued movement of armored vehicles and the interdictory fires laid down by the assault guns, artillery howitzers and tank destroyer guns, created the illusion of greater strength than actually existed. The fact that on October 1 an entire corps (V Corps) began taking over the sector of the 4th Cavalry Group is felt to have been proof of the magnitude of the unit's accomplishment.

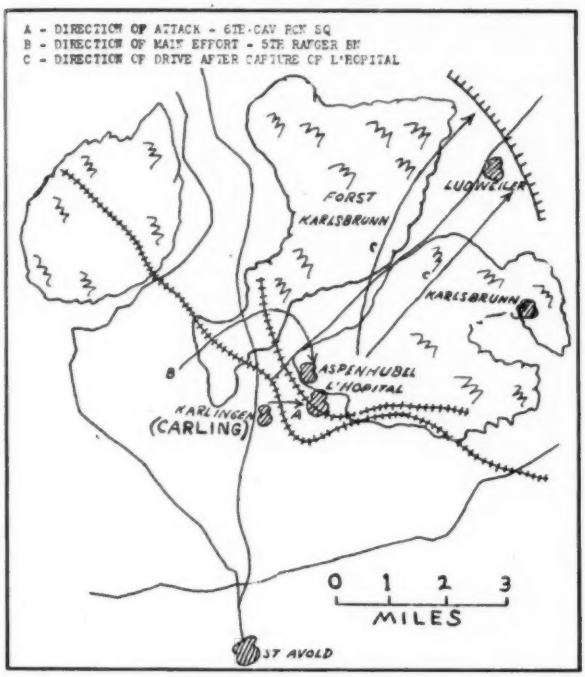
The 6th Cavalry Group

Attack to seize L'Hopital and clear Karlsbrunn Forest, December 2-5, 1944.

ON December 1, 1944, the 6th Cavalry (less 28th Cavalry Reconnaissance Squadron), reinforced by 5th Ranger Battalion, Company C 602d Tank Destroyer Battalion and Company B 293d Engineer (C) Battalion, was attached to XX Corps and given the mission of: protecting the right flank of the corps; breaching the German line of defense at L'Hopital; and clearing the forest of Karlsbrunn to the northeast. The 6th Cavalry Group promptly moved into an assembly area northeast of Saint Avold. The 6th Cavalry Reconnaissance Squadron, with Company D 5th Ranger Battalion attached, relieved one battalion of the 10th Infantry Regiment in Carling and made plans for a frontal assault on L'Hopital, which was separated from Carling by a deep railway cut. Meanwhile, the 5th Ranger Battalion (less Company D), which was to make the main effort on the left, moved into an assembly area northeast of Carling under the cover of woods.

The attack was to begin at 0830 hours December 2, and artillery support was to be provided by the 5th Infantry Division, but because of a lack of time this arrangement had not been completed. Actually, the attack of the ranger battalion, reinforced by light tanks, started at 0900 hours. The tanks, however, could not be used effectively because of the deep mud, and the battalion soon came under heavy artillery and automatic weapons fire. As a result, its attack was temporarily halted after it crossed the railroad track. In the meantime, the 6th Cavalry Reconnaissance Squadron was engaged along the railroad cut between Carling and L'Hopital.

During the night of December 2-3, 1944, the 6th Cavalry Reconnaissance Squadron pushed across the railroad cut and entered the southern edge of L'Hopital, where they came under heavy artillery and mortar fire. After clearing a portion of the town an enemy counter-attack inflicted heavy casualties and forced them to withdraw to the railroad embankment. Meanwhile, the main attack by the 5th Ranger Battalion advanced slowly through the woods to the northeast of L'Hopital. December 4 was spent in advancing the ranger battalion and in making arrangements to receive artillery support from the 19th Field Artillery Battalion, 5th Infantry Division. Early December 5, after a heavy artillery preparation on L'Hopital, the town was captured and cleared by a combined attack of the 6th Cavalry Reconnaissance Squadron and the 5th Ranger Battalion. The cavalry attacked east across the railroad while the rangers drove in from the northeast. The vigor of the attack carried the 6th Cavalry Reconnaissance Squadron through the enemy supports and well into the forest of Karlsbrunn. As a result, enemy artillery was forced to displace and, freed from artillery fire, the 6th Cavalry Group quickly cleared the forest and gained the high ground to the east.



The action was almost entirely dismounted—armored car, tank and destroyer support being difficult due to the heavy mud and the steep approaches to the railway embankment. The attacking forces were initially handicapped by lack of sufficient time for making reconnaissance and for arranging for artillery support. When these difficulties had been overcome, however, the objectives were gained without undue losses, and the attack was strongly pushed. This action illustrates the handicap under which mechanized cavalry forces were placed when operating dismounted without their normal mobile fire support. It also, however, illustrates the ability of mechanized cavalry to overcome that handicap, when reinforced with infantry and aggressively led.

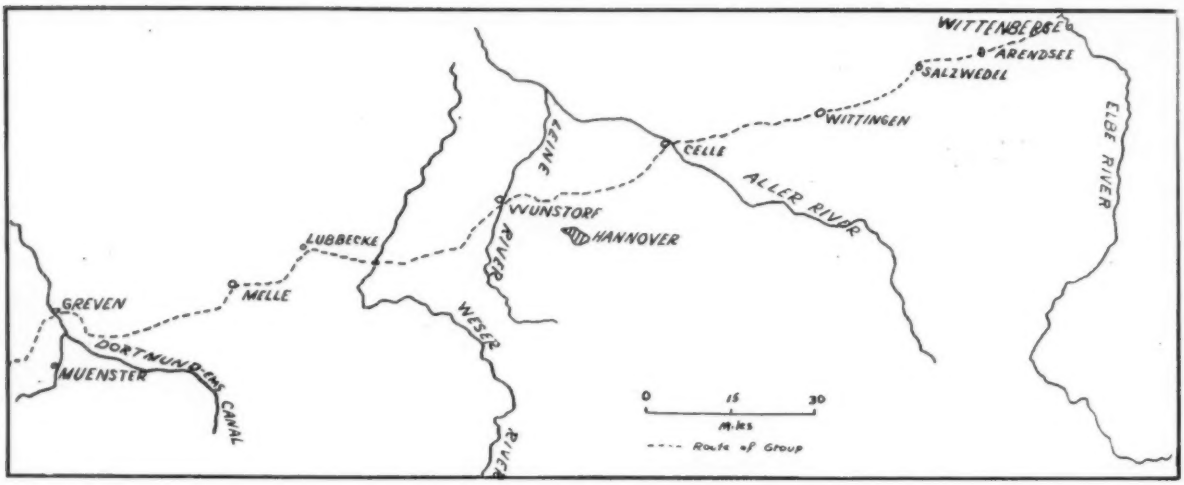
The 11th Cavalry Group

Protection of the north flank of the XIII Corps during the advance from the Rhine to the Elbe rivers, April 2-15, 1945.

ON April 1, 1945, the 11th Cavalry Group, to which was attached the 771st Tank Destroyer Battalion, was assembled near Rorup, about 15 miles west of Muenster, and was attached to XIII Corps, the left corps of Ninth Army. The group was given the mission of protecting the left (north) flank of the XIII Corps from Coesfeld to the east, and of maintaining contact with the Second British Army on the left. This mission was initiated early April 2. In its execution, up to April 15, the 11th Group travelled about 225 miles.

Although the group's mission was one of security, its performance required much offensive combat. The stiffest enemy resistance was met north of Muenster, after the crossing of the Dortmund-Ems Canal, and north of Hannover, at the crossing of the Leine River; but throughout the advance, it was necessary for the 11th Cavalry Group to fight its way into all the towns which lay in its path.

Maintaining contact with the Second British Army was difficult. As far east as Hannover, American and British forces were in close proximity. However, one and then the other was in the lead, and the task became mainly one of coördination; for example, just west of Hannover, a British unit came into a town from the north as the 11th Cavalry Group entered it from the west. Again, just north of Hannover, the route taken by the 11th Cavalry Group was identical with one assigned to a British reconnaissance unit. After Hannover had been passed, however, British elements turned north toward Hamburg, and so a considerable gap was developed which measured from a few to as many as 50 miles. During this period, contact with the British was



maintained through personal visits by the squadron commander and members of his staff, and by an officer-radio liaison team. This liaison was maintained until the group reached the Elbe River.

The 11th Cavalry Group was employed tactically as follows: Squadrons, with a tank destroyer company attached to each, were disposed abreast in sectors facing generally north. Upon group order, the western squadron would move east on a route passing to the south of the eastern squadron, and fight its way to occupy a sector farther east, and this movement was so timed as to insure the arrival of the squadron on its new line in time to protect the north flank of the leading elements of the 84th Infantry Division. (This unit was the left division of XIII Corps, which was advancing east in a zone immediately to the south of the 11th Cavalry Group.) Each squadron habitually employed three task forces or teams, each composed of a cavalry reconnaissance troop, with a platoon of light tanks, a platoon of assault guns and a platoon of tank destroyers attached. The order of march of these teams was alternated during the squadron's advance to its new sector.

This operation illustrated the marked ability of mechanized cavalry to cover open flanks, and to maintain contact with adjacent units in fast-moving action.

* * *

A series of articles on the employment of cavalry in combat in the European Theater, of which the above articles are a part, will be continued in forthcoming editions of *The Cavalry Journal*. Remaining articles include:

113th Cavalry Group: Reconnaissance of the XIX Corps' zone of action, L'Escaut Canal to Albert Canal, September 5-8, 1944.

113th Cavalry Group: Defense of the north flank of the 12th Army Group, Sittard area, September 19—November 12, 1944.

2d Cavalry Reconnaissance Squadron: Crossing of the Moselle River and seizure of Wincheringen as a diversion for an attack by the XX Corps, February 19, 1945.

38th Cavalry Reconnaissance Squadron: Defense of the Monschau area against German attack, December 16-17, 1944.

78th Cavalry Reconnaissance Squadron: Attack against Meinkenbracht, April 12, 1945.

86th Cavalry Reconnaissance Squadron: Screening of the 6th Armored Division, near Muehlhausen, April 5-12, 1945.

89th Cavalry Reconnaissance Squadron: Delaying action by Troops A, B, C and E, Befort area, December 16-25, 1944.

92d Cavalry Reconnaissance Squadron: Reconnaissance for the 12th Armored Division, Neustadt area, April 8-16, 1945.

80th Cavalry Reconnaissance Troop: Reconnaissance during advance of the 80th Infantry Division to Kassel, April 1-3, 1945.

104th Cavalry Reconnaissance Troop: Attack from Borgentreich area to Weser River in advance of the 104th Infantry Division, April 7, 1945.

U.S. Cavalry in the ETO

The assignments and attachments of Mechanized Cavalry Groups and of separate Mechanized Cavalry Reconnaissance Squadrons, and the campaigns in which they participated, in the European Theater of Operations.

Group	Normally Attached Squadrons	Date Entered Active Combat In ETO As Group	Army (ies) to Which Assigned	CORPS TO WHICH ATTACHED — CAMPAIGNS: Normandy	Northern France	Southern France	Ardennes	Rhineland	Central Europe
2d		July 19, 1944	Third	ADSEC	VIII XII		XII XX	XII	XII
	2d		Third	ADSEC	VIII XII		XII XX	XII	XII
	42d		Third	ADSEC	VII XII		XII XX	XII	XII
3d		Aug. 10, 1944	Third		XX		XX	XX	XX
	3d		Third		XX XII		XX	XX	XX
	43d		Third		XX		XX	XX	XX
4th		June 18, 1944	First	VII	VII		VII	VII	VII
	4th		First	VII	VII		VII	VII	VII
	24th		First	VII	VII		VII	VII	VII
6th		Aug. 2, 1944	Third	Army	Army		III	VIII	VIII
	6th		Third	Army	Army		III	VIII	VIII
	28th		Third	Army	Army		III	VIII	VIII
11th		Dec. 14, 1944	Ninth					XIII	XIII
	36th		Ninth					XIII	XIII
	44th		Ninth					XIII	XIII
14th		Dec. 11, 1944	First (until Apr. 18) Third				VIII	XVIII III	III
	18th		First (until Apr. 18) Third				VIII	XVIII III	III
	32d		First (until Apr. 18) Third				VIII	XVIII III	III
15th		July, 1944	Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII			XVI	XIX XVI
	15th		Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII			XVI	XIX XVI
	17th		Third (until Sept. 22) Ninth	ADSEC	ADSEC VIII Ninth Army			XIX, XIII XVI Ninth Army	XIX XVI
16th		Mar. 10, 1945	Third (until April 1) Fifteenth					XX	XII XX XXII
	16th		Third (until April 1) Fifteenth					XX	XII XX XXII
	19th		Third (until April 1) Fifteenth					XX	XII XX XXII
101st		Feb. 9, 1945	Seventh					XV XXI	XXI
	101st		Seventh					XV XXI	XXI
	116th		Seventh					XV XXI	XXI
102d		June 12, 1944	First Seventh (Atchd. Mar. 16-28)	V	V		V VII XIX	V VI	V
	38th		First Seventh (Atchd. Mar. 16-28)	V	V		V	V VI	V
	102d		First	V	V		V VII XIX	V	V
106th		July 6, 1944	First (until Aug.) Third	VIII	XV XII		XV	XV	XV
	106th		First (until Aug.) Third	VIII	XV XII		XV	XV	XV
	121st		First (until Aug.) Third	VIII	XV XII		XV	XV	XV
113th		July 4, 1944	First (until Oct. 22) Ninth	XIX	XIX			XIX XIII	XIX XIII
	113th		First (until Oct. 22) Ninth	XIX	XIX			XIX XIII	XIX XIII
	125th		First (until Oct. 22) Ninth	XIX	XIX		Ninth Army	XIX XIII	XIX XIII
115th		Mar. 12, 1945	Fifteenth Seventh (Atchd. from Apr. 25)		66th Inf. Div.				VI
	104th		Fifteenth		66th Inf. Div.				
	107th		Fifteenth Seventh (Atchd. from Apr. 25)		66th Inf. Div.				VI
	117th	Aug. 15, 1944	Seventh			VI		VI	VI

ORDERS FOR THE DELIBERA

by Colonel Hamilton H.

IN his articles in the *Infantry Journal*, Major General Orlando Ward warns repeatedly against leaning too heavily, in battle, on inspiration, suggests with much wisdom that practice among the various types of troops involved, and careful planning by higher echelons, are better assurances of success. Fruitful inspiration, he says, comes hard to the company officer when confusion and shell fragments become about equally thick.

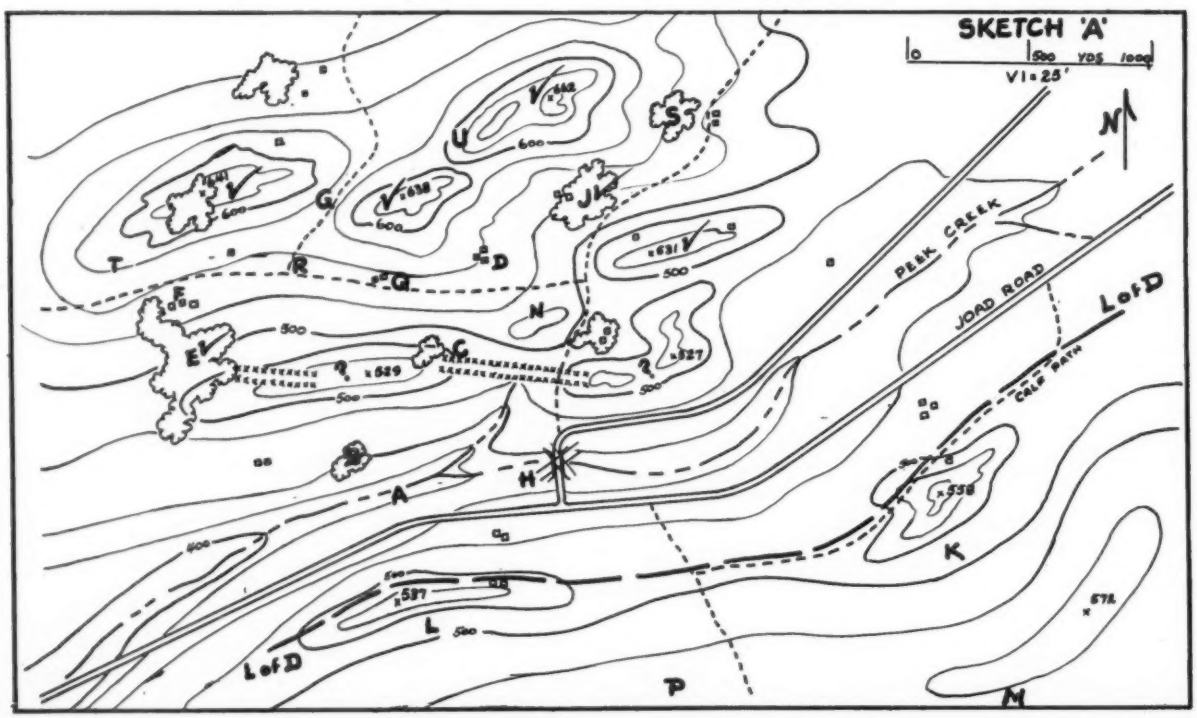
Certainly many American attacks have failed altogether, or have failed partially, because of the lack of adequate tactical planning; additional others have failed because a plan, though proper, has not been adequately understood by subordinate commanders.

It will be acknowledged that no attack demands more careful planning nor more precise execution than the deliberate attack against a strongly prepared and strongly manned enemy position. Such a position normally is best taken by a sequence of intimately associated and accurately coördinated actions that methodically open the position to the attacker. Classic examples of expert planning, thorough practice, and superb execution are the German attack on Fort Eben Emael and the British attack at El Alamein, and some of our amphibious assaults deserve to be placed in the same high category. All these operations were preceded by repeated rehearsals.

It is obviously imperative, to effect the most overwhelming success, that each subordinate commander know what other commanders are doing, particularly in the matter of *time*. Once that it is settled, in the plan, that a certain system of attack is to obtain and a certain schedule is to be followed, the plan will gain tremendously in force if it is backed up by official, written orders, sufficiently detailed to insure understanding.

It is extremely difficult to get forth a detailed plan in the orthodox 5-Paragraph order, unsupported. Our present Paragraph 3 says, in effect, "Joe, do this, then do this, then do this, then do this and this," after which it tells Harry to "do that, then that, then that, and that and that"—and so on through all the units involved. Joe and Harry frequently have considerable difficulty

(Colonel Howze was G-3 of the 1st Armored Division during most of the Tunisian campaign, and fought through the last actions in Tunisia as commanding officer of the 2d Battalion, 13th Armored Regiment. He was in command of the 13th Armored Regiment during the retraining period in North Africa, and the Italian campaign. Colonel Howze was awarded the Silver Star, *the* Bronze Star, *and the* Legion of Merit.—EDITOR'S NOTE.)



ATE ATTACK

H. Howze, Cavalry

in seeing how the fifth "this" fits in with the sixth "that," particularly in point of time. It is very possible in fact, that the true connection between them will not be apparent at all.

The coördination of the various "thises" and "thats" are settled in conference by Harry and Joe, and their decisions and agreements, though possibly correct, are not backed up by *orders*. In the execution, Harry, if a little weak, may plead misunderstanding, and Joe's attack may break down because Harry didn't secure the little patch of woods on his right. No officer can have seen much fighting in the last war who did not observe such a thing, perhaps frequently.

The "Phase Plan"—so-called for lack of a better name—which is here proposed is in effect a chronological organization of orders, as against the usual system of presenting instructions to each unit in order as it appears on the troop list. A very rough analogy is the A F of L horizontal organization as against the CIO vertical scheme.

It is necessary to emphasize that such detailed planning—and consequent volume of paper—is suggested only when a fairly generous amount of time is available for its formulation, for conferences and critiques upon it, and for its eventual publication and dissemination in orders.

The phase plan is eventually issued in the form of a table. An idea of its form and usefulness can best be given by an example. Certain objections to the phase plan may spring to the mind of the reader—especially if he is an adherent to the very excellent principle of allowing proper independence to the subordinate commander. It is my contention that neither this nor any other military principle is in any way violated by this scheme, but I shall reserve details of discussion until the end of the article.

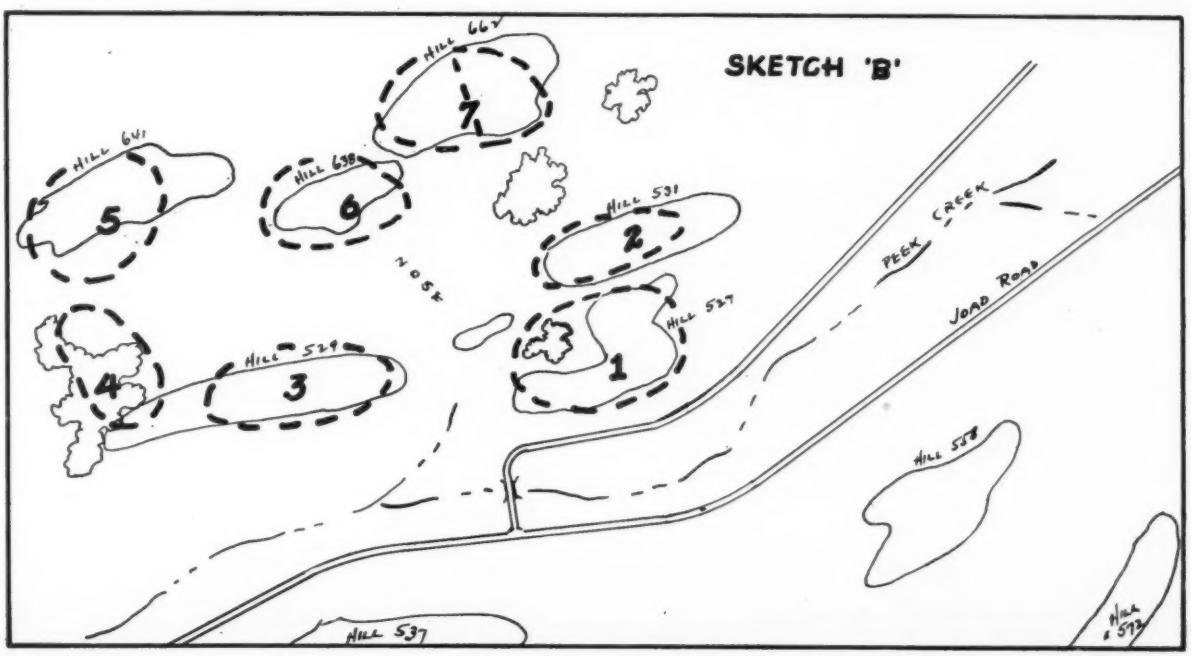
Situation: (See Sketch A).

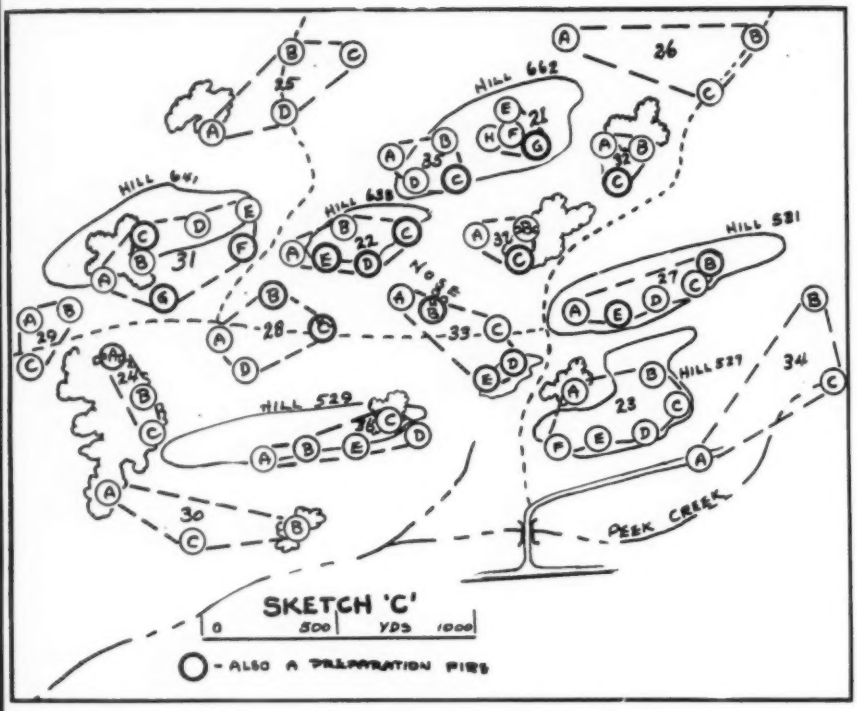
Blues (S) and Reds have been in present positions for a period of about one month.

Blues intend to launch a general offensive in about 10 days. In this sector, Blues occupy Hill 537, Hill 558, and the ridge south of these two.

Peek Creek is practically dry, but the bed is sunken and requires engineer work to effect tank crossings. The bridge at H is down.

Reds are known to occupy Hills 641, 638, 662, and 531 (each indicated by a check mark), houses at D, and woods at E and J. Question marks indicate features possibly held: our patrols have frequently visited Hills 529 and 527, and sometimes are engaged by MG fire or enemy patrols, and sometimes are not. On features known to be occupied by the enemy, various intelligence sources have located accurately a number of enemy field-works, but no one feels that *all* enemy locations are known. Similarly, a number of enemy mortar, artillery and *nebelwerfer* positions are known, but not all. Antitank minefields are known to exist approximately where indicated. The Red infantry strength in the sector is thought to be two battalions of about 400 each, reinforced by AT guns. Enemy reserves available within two hours: one infantry battalion, 15 tanks (estimated).





This indicates a method, somewhat contrary to normal artillery practice, of making up a sheet indicating the prearranged artillery fires on call to assault commanders. The scale should be identical to that of the tactical map issued to small unit commanders, but the paper may be opaque. Included on the sheet are certain landmarks and contours taken from the map: enough to identify at a glance each of the concentrations and concentration blocks. A quick comparison of this sketch and Sketch A will closely locate any concentration on Sketch A; this will be made doubly sure if the using officer will copy merely the outlines of the concentration blocks on his map, here represented by Sketch A. Too much artillery data placed directly on the map will of course obscure it.

Concentrations are not merely KNOWN enemy positions; they include POSSIBLE enemy positions plus certain BLOCKING concentrations to cover a flank; e.g., 29A and 29C will be useful to block enemy fire coming into the left flank of our troops moving north onto Obj. 5. Concentrations selected are grouped into blocks primarily according to the wishes of the over-all assault commander and the battalion commanders, with careful consideration of their schemes and maneuver.

Numbering the concentration blocks and lettering the concentrations will help legibility, it being unnecessary to cram a three-digit figure into a small, complaining circle.

Date of attack, June 1. Dawn is at 0500 hours. Weather expected fair. Ground firm.

The Blue Corps Commander has ordered a general counterbattery program to be fired from 0400 to 0500 on D Day. Preparation fires will be as directed by each sector commander. Limits for time of attack have been set by the Corps Commander: H hour will be between 0445 and 0515.

Plan: (See Sketch A).

(This article is not designed to present a tactical problem—therefore, the scheme of attack here presented is considered as a commander's decision, right or wrong.)

In very general terms, the plan provides for:

a. A formal preparation to be omitted, but guns to be laid ready to fire a 5-minute preparation when the enemy indicates he has discovered the attack.

b. H hour to be at 0445 (15 minutes prior to first light) L of D as indicated on Sketch A.

c. An effort to be made to build by stealth a tank crossing over Peek Creek at A, the work to be covered by a small protective force at B.

d. TD overhead direct fire support to be rendered from vicinity of P.

e. Initial attack: 1st Bn 6 Inf to take Obj. 1, (see Sketch B); 3d Bn 6 Inf (+1 tank company) to take Obj. 3.

f. Engineers to gap minefield at C.

g. 2d Bn 6 Inf to take Obj. 2 (passing through Obj. 1).

h. 13 Tank Bn (−), moving via Gap at C, to take Objs. 4 and 5, and vigorously assist in taking Objs. 6 and 7.

i. 1st Bn (from Obj. 1) to take Obj. 6 from the west.

j. 3d Bn to take Obj. 7 (passing through Obj. 6).

k. As each objective is taken, fire to be placed on subsequent objectives and closely coördinated with the effort of the troops designated to take those objectives.

l. 1st Bn 7 Inf to remain in reserve throughout.

This plan is not particularly complicated, but neither is it entirely simple—not so simple, for example, as a straight frontal attack on Objs. 5, 6 and 7 (the main position) simultaneously. The plan will permit tanks to be used to their utmost; it takes advantage of the protection offered by the nose DN (extending Southeast from Hill 638) against fire from Hill 662; it provides for taking Hills 638 and 662 from the flank. Without attempting to hold a brief for this plan, the tactical soundness of which is unimportant to the object of this article, it is desired to emphasize that simplicity, however desirable, must sometimes be sacrificed in an attack against a strong position, and further that the resultant more complicated plan demands a clear presentation in orders so that they can be thoroughly understood and executed by the troops.

To effect the "coördinated execution" of this plan, it is proposed to present the details of it in a "Phase Plan" as previously mentioned. The phase plan does *not* preclude the necessity for the Paragraph 3 of the Field Order, but it does take over much of its function. The Paragraph 3 must clearly state the prime mission of each unit, still a necessary provision. As a sample, this briefer form of Paragraph 3 is stated for one unit only, the 1st Bn 6 Inf:

"3. *a.* The 1st Bn 6 Inf will attack to seize Obj. 1, assist by fire the attack on Obj. 2, and will attack in conjunction with the 13th Tk Bn to seize Obj. 6, and assist by fire the attack on Obj. 7. (See Phase Plan)."

SEE NOTES BELOW.

Phase	Time	Unit	Action
1. a.	0400	27 FA	Pieces laid for preparation fires (Concentrations 27E, 27B, 32C, 37C, 21G, 35C, 33E, 33D, 33B)
b.	0400	68 FA	Pieces laid for preparation fires (Concentrations 22C, 22E, 22D, 28B, 28C, 24A, 31C, 31F, 31G)
c.	0400	Co C 136 Chem Mtr Bn	Pieces laid for preparation fires (Concentrations Omitted)
d. (1)	0400	Mortars 1st Bn 6 Inf	—do—
(2)	0400	Mortars 2d Bn 6 Inf	—do—
etc.	etc.	etc.	All preparatory fires made ready to be laid down on call
#2. a.	0330	1st Bn 6 Inf (Co F 6 Inf attchd)	Close in assembly area at K
# b.	0400	2d Bn 6 Inf (—Co F)	Close in assembly area at M
# c.	0400	3d Bn 6 Inf	Close in assembly area at L
# d.	0430	Co A 13 Tk Bn	Close in assembly area at L, attached on arrival to 3d Bn 6 Inf.
# e.	0330	Co C 16 Engr	Close in assembly area at L
# f.	0500	13 Tk Bn (—Co A) Co B 701 TD Bn attchd	Close in assembly area at (point 1000 yards south of L)
etc.	etc.	etc.	All elements are moved into respective assembly areas
3. a.	WO	27 FA	Execute preparatory fires (30 rounds on each of nine concentrations. Total elapsed time, 5 minutes)
b.	WO	68 FA	—do—
etc.	etc.	etc.	All fire elements are similarly instructed. (Note: The preparatory fires are on call by the CO of any of the attacking infantry battalions, subject to approval by the force commander.)
#4. a.	0330	1st Plat Co K, 3d Bn, 6 Inf	Occupy woods at B, and from that point cover work of engineers building crossing at A.
# b.	0330-0430	2d Plat Co C, 16 Eng	Complete tank crossing at A. (Post Markers).
#5. a.	Cross L of D at 0445	1st Bn 6 Inf	Attack to seize Obj. 1
# b.	Cross L of D at 0445	3d Bn 6 Inf (+ Co A 13 Tk Bn)	Attack to seize Obj. 3. Pick up Plat at B. Tanks cannot see to shoot prior to 0510.
# c.	Cross L of D at about 0500	Gapping parties Co C 16 Engr	Follow directly behind 3d Bn 6 Inf to C.
# d.	0515	2d Bn 6 Inf	Close in assembly area at K. Await attack orders. Co. C, 701 TD Bn, joins and is attached.
# e.	0515	Co C 701 TD Bn	Closes in assembly area at K. Attached to 2d Bn 6 Inf.
# f.	0530	1st Bn 7 Inf	Close in assembly area at M. Remain in Reserve in that locality.
#6. a.	0445	Co A, 701 TD Bn	Occupy previously selected positions at P.
b.	0515-UOL	—do—	Engage by fire targets of opportunity which may appear on forward slopes of Hills 638 and 662, beyond (north of) the line QDJ, *only* (See Note (8)).
7. a.	WO	27 FA	Fire counter mortar program (Conc. omitted)
b.	WO	68 FA	—do—
etc.	etc.	etc.	Similar instructions to all high angle fire units, including infantry battalion mortars. Mortar program based on known and suspected positions, and developed over period of last month. On call by CO of any attacking battalion, upon approval of Force Comdr.

Phase	Time	Unit	Action
#8. a.	0545 (Target Time)	1st Bn 6 Inf (+)	Occupy Obj. 1. Engage by fire targets on Obj. 2 and at points N, D, and J. Cover by fire engineer gapping parties at C.
# b.	0545 (TT)	3d Bn 6 Inf (+)	Occupy Obj. 3. Engage by fire targets on Obj. 4, 5 and 6, and at Point Q. Protect engineer gapping parties at C.
# c.	0545 (TT)	Gapping parties Co C 16 Engr	Gap minefield (minimum gap width 24 feet) at C. Estimated completion time 20 minutes after Target Time. Post markers. Notify CO 13 Tk Bn.
9. a.	WO	2d Bn 6 Inf (+)	Move via Obj. 1, attack to secure Obj. 2.
b.	WO	13th Tk Bn (—)	Move via route: west of Hill 537—A—gap at C, to seize Obj. 4 and Obj. 5, in that order.
c.	WO	3d Bn 6 Inf	Assist, with one company (Co K) the attack of the 13th Tk Bn on Obj. 4. Emplace the attached tank company (Co A) on Hill 529 to overwatch the attack of the balance of the 13th Tk Bn; on arrival in that overwatching position, Co A reverts to command of CO, 13th Tk Bn.
d. (1)	WO	Co C, 136 Chem Mortar Bn	Smoke line UJ, to block off Obj. 7. However, if wind should commence carrying smoke westerly, cease smoking operations immediately.
(2)	WO	Mortars, 1st Bn 6 Inf and 1st Bn 7 Inf	Fire concentrations—and—(assumed just north of Point N, actual locations omitted).
(3)	WO	68 FA	Fire concentration Block 22.
(4)	WO	27 FA	Fire Concentration Block 33.
(5)	WO	Co A 701 TD Bn	Watch particularly for, and engage any enemy tanks which may appear vicinity Obj. 6 or in gap at G.
			(Phase 9d is designed to protect R flank of 13th Bn as it makes the dangerous turn after passing through minefield at C).
#10. a.	0700 (TT)	2d Bn 6 Inf (+ Co C 701 TD)	Occupy Obj. 2. From that position: Protect R of force, and assist by fire the attacks on Obj. 6 and Obj. 7. (See Phases 11*a* and 13*c* below.)
# b.(1)	0700 (TT)	Elements 13th Tk Bn (—) (Assisted by Co K, 6 Inf)	Occupy Obj. 4 } Operations against Objs. 4 and 5 are concurrent.
# (2)	0715 (TT)	—do—	Occupy Obj. 5. }
11. a.	WO	1st Bn 6 Inf (+)	Move from Obj. 1, via route: S of Obj. 3—Point R, to attack Obj. 6.
b.	WO	13th Tk Bn (—)	Emplace one company to secure Obj. 5. With remainder of force, assist 1st Bn 6 Inf (+) in attack on Obj. 6. (Tanks should be able to climb western face.)
c.	WO	1st Bn 7 Inf	Move to reserve position vicinity Obj. 2.
12. a. (1)	WO	2d Bn 6 Inf (+)	Lift fire from Obj. 6. Continue fire Obj. 7.
(2)	WO	—do—	Lift fire from west half Obj. 7. Continue fire on east half.
(3)	WO	—do—	Lift all fire from Obj. 7.
b. (1)	WO	Co A 701 TD (at Point P)	Lift fire from Obj. 6. Continue fire on Obj. 7.
(2)	—do—	—do—	Lift fire from Obj. 7.
13. a.	0815 (TT)	1st Bn 6 Inf (+)	Occupy Obj. 6. Support by fire attack on Obj. 7.
b.	WO	13th Tk Bn (—)	Continue to occupy Obj. 5. Co A may be moved forward from Obj. 2. From Point G and Obj. 6, support, by fire, attack on Obj. 7.
# c.	WO	3d Bn 6 Inf	Move via Obj. 6 to attack Obj. 7 (Start of movement *may* be ordered prior to completion of Phase 13*a*.)

#14.		0915 (TT)	3d Bn 6 Inf	Occupy Obj. 7. Clean out woods at S.
15.	a.	WO	One Company 13 Tk Bn	Move via route R—Q—D to flush (by fire) enemy from woods at J. If resistance continues, 2d Bn 6 Inf will (on order) assist, by occupation of woods.
	b.	WO	2d Bn 6 Inf	(See above)
#16.	a.	Without Orders	3d Bn 6 Inf	Organize Obj. 7 for defense against counterattack (See 16*d* (1) below).
#	b.	Without Orders	1st Bn 6 Inf (+)	Organize Objs. 5 and 6 for defense against counterattack.
#	c.	WO	13th Tk Bn	Assemble Bn in area GRQ in counterattack reserve and in preparation for missions of exploitation. Emplace one platoon in direct firing position at G and one at T, to engage targets of opportunity and to resist possible counterattack.
#	d.(1)	WO	2d Bn 6 Inf	Send Co C 701 TD to Obj. 7, where it becomes attached to 3d Bn 6 Inf.
#	(2)	WO	2d Bn 6 Inf	Force Reserve. Assemble vicinity Point N.
	e.	WO	1st Bn 7 Inf	In vicinity Obj. 2, remain assembled and prepared for exploiting mission in conjunction with 13 Tk Bn.

NOTES:

(1) To spare reader unnecessary detail, the "Phase Plan" is not entirely complete.

(2) "WO" equals "When Ordered." "UOL" equals "Until Ordered Lifted."

(3) "TT" equals "Target Time," or estimated time of accomplishment. This is at best an educated guess, but it serves to inform all concerned of the commander's idea of the time necessary to accomplish each job.

(4) "#" equals "Report Necessary." A report of accomplishment of this phase is mandatory. Such a report need be no more than (for example), "Phase Six Able, Okay."

(5) Routes to assembly areas are omitted.

(6) To fit all available firepower properly into the whole scheme of fire, certain missions are prescribed even for such elements as the infantry battalion mortar platoons. These missions are confined however to the mortars' respective parts in the preparatory fires and the countermortar program, and the infantry battalion commander retains first call on his mortar fire.

(7) Time schedule may be changed as the action progresses. Favorable results may speed it. Note that Phase 11*a* may be ordered before Phase 10*b* (2) is completed.

(8) Tanks or TD elements rendering direct fire support from stationary positions do so best according to a prearranged schedule, engaging specific known, suspected, or probable enemy positions. Careful, previous reconnaissance is necessary, and ground horizontal photographs to identify each target selected will be especially valuable.

It will be noted that the phase plan specifies certain actions by parts of subordinate units; an example is Phase 4 Able, which specifically requires the 1st Plat, Co K, 6 Inf (which still remains under command of the Battalion Commander) to occupy the woods at B to cover the engineers. This and all the other details of the plan should have been discussed carefully with the subordinate commanders, the plan perhaps modified according to their ideas, and, where practicable, their willing approval of it obtained. Then, after conference and discussion, the final scheme is made official and specific by publication as a part of orders.

Rigidity certainly need not result from the use of such a plan. The entire scheme may be abandoned by a single radio order, and nothing shall have been lost. *Modification* should be expected as normal, but modification is exceptionally easy to effect, since the original scheme is firmly impressed on all concerned. The phase plan is a good framework on which to hang changes, and the orders are usually simple: "Delay execution of Phase 2 by one hour," for example; or perhaps the reserve might be ordered to execute a phase originally the responsibility of another unit.

As intimated above, the phase plan becomes an excellent convention and a low-order code. In the situation described, one of the leading infantry battalions may come under considerable fire after it crosses the Line of Departure: to obtain the entire preparatory fire program the Battalion Commander merely asks, "Request execution of all of Phase 3." A request for execution of Phase 7 should bring down the entire countermortar program—or such parts of it necessary to engage the general area where enemy mortars are thought to be firing. Request for Phase 9 Dog will cover by fire the right flank of the tanks making a flanking movement in the face of the enemy. The arrival of the 3d Bn 6 Inf in its assembly area is reported by "Phase 2 Charlie, Okay." "Execute Phase 6*b*" will launch all the action listed there under. And so forth.

The writing of the phase plan demands that the commander think completely through his battle, to include the organization of the objective against enemy counterattack. It sets down, in detail, the scheme of maneuver, so that all concerned may thoroughly understand the commander's object and methods, beyond possibility of doubt.

Although the various phases of the phase plan are numbered and listed in approximate chronological order, the chronology may vary, and some phases are actually concurrent with others. However that may be, the subordinate commander will gain a very accurate idea of the expected or intended sequence of events, and where, in that sequence, he fits, where flanking or following units fit, where direct and indirect supporting fire units fit.

Finally, it may be said that the phase plan works, in battle, and furthermore that it is not offensive to subordinate commanders who have had ample chance to study it previously and suggest change; rather, battalion commanders, in my experience, welcome specific responsibilities and appreciate definite fixing of tasks upon themselves and upon units to their right and left —units upon which depend so heavily their own success and well-being.

The Tank-Infantry Team In An Armored Division

*by Major Edward Bautz, Infantry**

MUCH has been written about the Tank-Infantry team as it applies to infantry divisions but little has been said about the modern bases of the Armored Tank-Infantry team—the tank and armored infantry battalions of the Armored Division. Here we have team work at a high level; having lived, worked, traveled, trained, and played together, the officers and men of these battalions more readily understand each other's problems, capabilities, and limitations—which is the primary requisite of any successful team. The Armored Tank-Infantry team is a part of the larger team which embodies the artillery, cavalry, engineers, air corps, and all supporting services. Proper employment of this team provides for the violent attack which makes manifest the potential shock action which is organic in the Armored Division, and in which speed, maneuverability, and fire power are combined and utilized to the fullest.

The following discussion is based on experience with the 4th Armored Division throughout the campaigns in Europe. It is one way in which tanks and infantry may be employed and its results have indicated it to be a successful way.

Let us examine more closely the Armored Tank-Infantry team, remembering always that it is only a part of the larger team. The infantry battalion consists of three rifle companies, a headquarters company, and a service company. The tank battalion consists of three medium tank companies, one light tank company, a headquarters company, and a service company. In each case the service company includes a maintenance platoon, and the headquarters company a reconnaissance, mortar, and assault gun platoon. In addition, the headquarters company of the infantry battalion possesses a heavy machine-gun platoon. Each of these battalions is administratively complete and thus is extremely flexible for tactical employment.

There are two ways of combining these battalions to make Tank-Infantry teams. First, we may attach an infantry company to a tank battalion and a tank company to an infantry battalion. The advantage of this system is that the next higher headquarters (Combat Command) has two complete subordinate headquarters, with commander and staff properly organized, which may be assigned separate phases of coördinated operations, or independent tasks. In assigning any particular mission, the combat commander will select the "infantry-heavy" team or the "tank-heavy" team in accordance with the type of the task. For example, if there are rivers to be crossed, woods to be cleared out, or cities to be seized, it is evident that the "infantry-heavy" team should be assigned this mission; conversely, when it is expected that a large number of enemy tanks or other armored vehicles will be encountered, the "tank-heavy" team would receive the call. The battalion not assigned the principal rôle remains in close support, ready to grasp any opportunity or unforseen "break" arising, or to neutralize and nullify any surprise hostile action. The disadvantages of this system are that a nonorganic element must be combined with, or attached to, a battalion, and normal administrative channels are somewhat disturbed. It places added administrative burdens on the attached company commander which would normally be absorbed by the battalion staff of his own battalion. From the battalion viewpoint, additional administrative arrangements must be made. For example, the armored infantry battalion does not have sufficient heavy wrecking equipment to evacuate knocked out tanks, and the tank battalion trains do not normally carry all types of ammunition required by an armored infantry company. To overcome this, small service elements of one battalion must be attached to the other battalion, which simply means the addition of another nonorganic element. In addition, enemy action, terrain, and the general enemy situation often do not permit the assignment of missions in accordance with the composition of the team and according to academic principles. Therefore, the "tank-heavy" team may find itself with a powerful force, but lacking sufficient infantry to execute effectively and efficiently the assigned mission, or any particular phase of that mission. The inverse is obviously true of the "infantry-heavy" team.

There is a second way of making an Armored Tank-Infantry team whereby the medium tank companies and the armored rifle companies are teamed together and in which both battalions operate in an integrated fashion. It may be said that this leaves the light tank company without infantry support but, if the situation warrants, a platoon may be attached to the light tank company from the armored infantry company least apt to be employed. It should be noted here that light tanks have a different mission than medium tanks and that infantry support, although desirable, is not as necessary in the

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accomplishment of their mission. The armored infantry ride with the tanks in their carriers, or on the tanks, and know tanks well enough to know how to protect them. Generally speaking, the infantry mission is to protect the tanks against close-in enemy attack with antitank rockets, grenades, explosive charges, etc. On the march, this may be accomplished by the infantry riding on tanks or in carriers and keeping careful watch to the immediate flanks; i.e. checking roadside ditches, clumps of bushes or woods, and windows in buildings. All doubtful areas are explored by fire by both infantry and tanks as they pass by. When it becomes necessary for the infantry to dismount and fight on foot, such as in town fighting, the same general system applies. In either case, aggressive infantry action, whether by fire alone or by fire and movement, is the best method of protecting the tank. It must also be remembered that the only place tanks cannot go is where it is physically impossible for them to go. There is no such thing as "tanks can't fight at night" or "tanks can't fight in towns" or "when the situation is uncertain, lead with infantry." Tanks and infantry move together wherever it is physically possible for the tanks to go. No definite formation is prescribed, for it varies with the terrain, enemy dispositions, and as the immediate mission changes. Supreme confidence in each other is the keynote to success, and this is soon realized in battle with tanks and infantry that have had the opportunity to train and live together. The tanks must take the initiative by virtue of the maneuverability and superior communications. Company commanders of infantry companies ride with company commanders of tank companies, infantry platoon commanders ride with tank platoon commanders, both battalion commanders stay close to each other, and their command posts are also together. With little transitional training, subordinate commanders of both battalions readily accept and understand orders issued by either battalion commander or members of either staff. With this type of team the combat commander must take a personal hand and will normally ride with or be near the two battalion commanders. In his absence, a battalion commander must definitely be designated as commander of the entire force. In actual practice with well-trained units, it is not necessary to designate an infantry company commander or a tank company commander as team commander in so many words. By experience and coöperation, and without formal order, an infantry commander takes over for an infantry mission and a tank commander for a tank mission, and in either case help each other in every possible way. This, however, is the goal to strive for, and in training or in initial action with strange troops teamed, it may be necessary to go by the rule: "The supported unit commander is in command." Thus, as the mission changes from a tank mission to an infantry mission, the commander is also changed. Except for particular instances (such as independent missions), staff officers must not be used to command the individual Armored Tank-Infantry company teams. If this is done, the whole operation of the staff is disrupted. Staff officers must be used freely to issue orders, inspect the progress being made, coördinate use of artillery, engineers, air, etc., and assist in making plans for future operations. This does not preclude a staff officer traveling with a team or moving along with any phase of an attack. In fact, this is desirable, since he takes over the duties of coördination and liaison with other units and supporting elements and thus permits the company commander to devote all his energies to the direction of his company. At the same time he is in a position to completely comprehend the situation and advise his commander. Properly employed, there are no excess staff members. Coöperation between units is directly dependent upon coöperation between individuals. When the commanders manifest the spirit of coöperation, then, and then only, can this system be successfully employed.

There are two distinct types of offensive operations in which the Armored Division is employed, commonly termed the "Rat Race" and the "Slugging Match." The former is characterized by rapid advances against spotty resistance of up to 100 miles a day, where the objectives are more or less strategic in nature—key terrain, bridges, road centers, railroad centers, sealing off a pocket, etc. In more technical language, it embodies the exploitation and pursuit. In contrast, the "Slugging Match" is characterized by advances counted in thousands of yards or a few miles a day against constant and usually strong resistance. Here the objectives are limited, consisting mainly of terrain dominating the immediate field of battle. This may be called the straight attack and may develop into an exploitation. In either case, a combination of tanks and infantry is more desirable than either one alone.

We have said that the "Rat Race" is characterized by rapid movement. The armored infantry may be mounted in their carriers or on tanks. In the latter case the carriers may be filled with ammunition, rations, fuel, and other supplies. Assuming that the Armored Tank-Infantry team is made up by matching company by company, let us see what further dispositions might be made. The light tank company with the assault gun platoons of both battalions attached, and perhaps one platoon of armored infantry, can lead or operate on an exposed flank. If the combat command is advancing along one road, between individual teams tactically spaced would be interspersed artillery, engineers, cavalry, trains, and other attachments allotted to the column.

Proper spacing and combination provides for elements near the front to crash through moderate resistance, to remove obstacles, or to provide a base of fire for other elements deeper in the column to maneuver. The actual order of march is a vital command decision but will not be touched upon here since discussion would require the building of a situation and appraisal of the entire combat command rather than merely of the Armored Tank-Infantry team about which we are con-

cerned. The following might be considered as a typical order of march for a combat command:

Light Tank Co. + Aslt. Gun Plats. Tank and Armd. Inf. Bn.

Command Group Tank and Armd. Inf. Bn. (*combat commander).

Medium Tank Co. and Armd. Inf. Co.
One Plat. Armd. Eng. + Bridge Truck.
Medium Tank Co. and Armd. Inf. Co.
Armd. F. A. Bn. (105mm SP).
Armd. Eng. Co. (—one Plat.).
Hqs. Co. Combat Command.
Hqs. Co. Div. Arty.
Armd. F. A. Bn. (105mm SP).
Hqs. Cos. Tank and Armd. Inf. Bn.
Medium Tank Co. and Armd. Inf. Co.
F. A. Bn. (155mm How.—towed).
Trains + (Btry. Antiaircraft).
Armd. Med. Co.
Armd. Ord. Co.
Mech. Cav. Troop + T. D. Co. on flank.

If the force is moving in more than one column, the light tanks may be used on one flank, and individual teams may be used to cover the other flank or take particular objectives off the main route. It is preferable that the main column move on the best road so that the trains may have the least difficulty in keeping up. Advancing in multiple columns makes possible a bigger sweep of area as well as shortening the time interval necessary for columns to close. The individual team of a tank company and armored infantry company combined is powerful enough to make a large attack and it is unhampered by trains and other administrative vehicles. For example, when attempting to seize a crossing over a river the chances of securing a bridge are greater if the force is divided, and three columns strike simultaneously for three bridges. If one of the small columns does become engaged with a force too large for it to handle it can easily be moved around the position, or their steps can be retraced and resistance by-passed at some distant point. It is also possible for these columns to use poor roads or to travel cross country for relatively long distances, and by doing so increase the chance of surprise. In this type of operation the entire force bivouacs in close formation and all-round security is provided. This is easily done with balanced Armored Tank-Infantry teams. The infantry can easily outpost the tanks and may assist the tanks in refueling, resupplying, and maintenance. At the same time, the tanks are in position where they may employ all of their weapons to support the infantry in case of an attack. Assault guns, mortars, and other similar organic means are emplaced, registered, and data computed for defensive fire. All elements of attached arms are coördinated to provide security from attack for 360 degrees. In this type of operation, all-round security is most important, for it is not unusual to be cut off from the rear. It was also found that command could be more easily exercised in this type of operation from a peep (¼ ton C&R) than from a tank. Difficulty was first experienced in communications, but by modifying the electrical system of the peep from six to 12 volts and replacing the SCR-510 by the SCR-508 this difficulty was eliminated.

Now let us consider what we have called the "Slugging Match." It was in this type of operation that the system of matching up tank and infantry companies was first employed. It has been previously stated that this type of operation was characterized by seizing one dominant terrain feature after another until the final objective was taken, or the limit of the day's operation was reached. In this case, the light tanks were normally used to follow up and protect the flanks that were opened by the advance of the medium companies. The armored infantry may ride in their carriers or on the tanks; the terrain and trafficability normally dictating the best solution, since the present carrier does not have the maneuverability of the tank. As in every operation, all plans are carefully laid in advance, including necessary artillery preparations and contemplated air strikes. The attack is then launched by each of these complete teams which move out one after the other and seize successively the dominant terrain features. This is a process of leapfrogging; when the first team reaches its objective it is in position to support the second team as it moves on to its objective. With three equally balanced teams, this process can be kept up almost indefinitely. At the same time, there is usually one team that is not engaged at any given moment; this team is then available as a reserve to reinforce one of the other teams or to take care of any unforeseen developments such as an enemy counterattack or a wide flanking movement. Coincidentally this team will have the opportunity for rest, maintenance, and resupply. The infantry again supports the tanks in the manner described before. A squad or half squad may be assigned to support each tank, or the bulk of the infantry may be shifted to support only a few tanks at any given time. The commanders again ride with each other and orders are issued over the tank radio. During these operations the mortar and assault gun platoons may be combined to supplement the support provided by the artillery. Frequently, however, the assault guns are employed well forward and deliver direct fire. It was found that these weapons could fire smoke missions very effectively and concentrations could be placed in small areas that the artillery was not reaching. The command post of these battalions is moved by bounds and is operated from stationary positions most of the time. By so doing the command post may be kept defiladed and usually within about 1,000 yards of the battle troops. This facilitates its functioning and there is little to fear from enemy action. Normally the executive officer and the S-1 operate the command post, handling all orders from higher headquarters, relaying information back to higher headquarters, handling all administration, resupply, and maintenance.

*Combat commander with such personnel as he may desire travels well forward in the column but frequently moves about.

The battalion commander with the S-2 and S-3 actually conducts the battle, while the S-4 circulates among the companies, command post, and higher echelon supply agencies. It is usual for company maintenance sections, less recovery vehicles, and all "thin-skinned" vehicles to remain with the battalion command post. Bivouac security is performed in the same manner as in the formation before described, with the exception that it is necessary to pay less attention to the rear since relatively short advances cross country permit a link-up or tie-in between flank units. This presents to the enemy a continuous line which runs the entire length of the front.

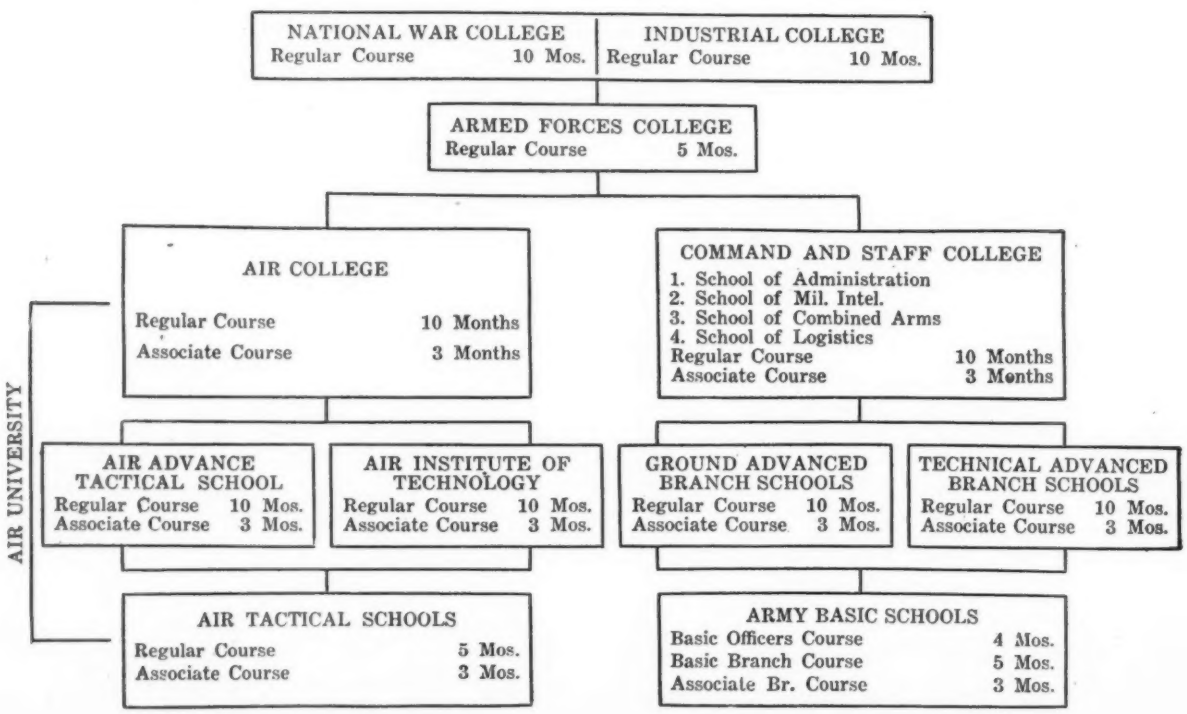
We have had a glimpse of the Armored Tank-Infantry team; we may consider it a model in teamwork. It is perhaps felt that little has been said about Tank-Infantry coöperation. Long periods of training together and living together provide the necessary spirit of cooperation which wins battles. Both tanks and infantry must be trained to attack. This makes for aggressiveness and develops an offensive state of mind that is ready and anxious to plan and execute; the spirit of cooperation comes spontaneously, and with this spirit manifest no missions will seem too difficult. This spirit is perhaps best embodied by the words of a sergeant tank commander who was overheard to say, "They've got us surrounded again—the poor so and so's." Success in the Armored Division depends primarily on a frame of mind which dictates attack at all times. Through such an attitude, the shock action, fire power, maneuverability, and speed of the armored Division is employed to its fullest.

NEW SCHOOL PLAN FOR OFFICERS

A REORGANIZATION of the Army officers' educational system has been approved to provide for the progressive military education of an officer from the time he receives his commission until he completes a course at a high-level school conducted on a joint Army-Navy-and-Air basis.

The system would provide training during the first 20 years of an officer's active duty, the formal schooling integrated with periods of practical experience in the field.

First for all officers except those in Air Forces would come a four-month course in subjects common to the Army as a whole followed immediately by a five-month basic branch course for indoctrination in subjects of his branch. Other higher-level courses would follow. —*Army Times.*



TANK COMBAT FIRING

*by Brigadier General Bruce C. Clarke**

The training methods outlined herein were developed in the 4th Armored Division and successfully used by Brigadier General (then Colonel) Bruce C. Clarke in that division and later in the 7th Armored Division, to obtain perfection in crew training.

EXCELLENT results were secured by the use of simple methods of developing and testing crew technique. Too much emphasis cannot be placed on the observation of test runs by crews who are waiting for, or have completed, their tests; the officer critique after each run; and the encouragement among all participating personnel of free discussion and constructive comments which frequently lead to the development of desirable and efficient crew procedures that may be standardized within the unit. The training doctrine expressed herein is concurred in by The Armored School. Crew training is a basic subject to which too little attention has been given in the past.

Aside from a few special situations, tanks on an offensive mission engage the enemy by closing with him during an advance. In such an operation the tank comes under observation and fire of an enemy tank or antitank weapon, or comes unexpectedly upon other enemy forces. In either case, the tank is usually moving when it sights a target. The success of its mission, and in most cases the safety of the tank and crew, depend upon the ability of the crew to take the enemy target under fire effectively within a few seconds; in short, to "shoot from the hip and hit." Such shooting is not done at long ranges—100 to 600 yards is the rule. The tank fires to hit on its first shot. It must out-shoot the enemy to live.

Each member of the crew must be trained to proficiency in his particular job in order that the crew may be able to take a surprise target under fire quickly and effectively. In addition, the crew must be trained as a team in order that all of the several actions required of the members can be performed quickly in proper sequence, so that the first shot is fired promptly and sensed properly and subsequent shots, if necessary, follow the first in rapid succession, with proper and immediate corrections applied.

Until the tank crews of a unit are trained to such a standard they will not have the confidence necessary to cause them to attack with the abandon and violence which characterizes the most effective tank action.

Individuals of a tank crew are trained to the proficiency set forth by FM 17-12 (Tank Gunnery) FM 17-67 (Crew Drill Med. Tank), and FM 17-68 (Crew Drill Light Tank). FMs 17-74 and 17-75 cover the M26 and M24 tank respectively. The status of the crew's training should be checked continually.

The next step is the preliminary crew training. This training consists initially of the tank commander working alone with each of the other members of the crew in turn, to perfect the commander-driver, commander-gunner, etc. relationships. This training is followed by dry-run practice with the whole crew until they are working together smoothly.

*Deputy Assistant Chief of Staff, Plans Section, AGF.

The commander-driver training can be carried out by maneuvering the tank in an area, with the tank commander giving commands in the prescribed manner until a mutual understanding between him and the driver is developed, and the expected reaction of the driver to the commander's orders is obtained.

The tank commander and gunner required the maximum training in working together. This can be accomplished by placing the tank in a stationary position where it has observation over varied terrain and having the commander select targets, issue orders, and work with his gunner until there is a smooth and rapid response to the proper fire orders.

The relationship between commander-driver and "bog" should not be neglected. Time spent in making sure that the loader functions without wasting precious seconds pays dividends.

When the proficiencies indicated above have been obtained, the whole crew can practice together and be checked by having an officer ride the back of the tank as it moves along a prescribed route. At intervals along this course the officer designates targets of various kinds and checks the orders of the tank commander and the execution of them by the members of the crew. More than one course is desirable. Later in the training, the time element should be introduced competitively between crews. The time is taken from the moment the commander acknowledges the target designated to the moment when the gun is layed. The laying is then checked.

The next step is combat firing. The ideal area for such firing is one in which the gun can be fired in any direction. Such areas are not usually available. The results can be suitably approximated in an area where one is permitted to fire in a small sector only. In such a set-up, an area of about 500 by 1,000 yards is required, the longer axis parallel to the line of fire. The nearest 600 yards of the area is used as a maneuver area, the farthest 400 yards as the target area. Targets may consist of almost anything: old vehicles, car bodies, or silhouettes. A valuable addition to the course is a moving target towed on each end by a tank.

The firing and testing is done as follows: The tank crew mounts, does the necessary checking (see FM 17-67 and FM 17-68), and when ready, the conducting officer mounts and has the tank move on a meandering course in the maneuver area. During the movement along the course, the conducting officer points out targets one at a time to the tank commander who takes them under fires. The conducting officer notes the time necessary to get off the first shot, and subsequent shots, if they are fired. He also notes the fire orders, sensings, actions of driver, gunner, loader and "bog," and records the results on the suggested form, shown herewith. During progress over the course, he selects and designates targets which will require the use of all the weapons and in several directions relative to the path of the tank. The tank commander is told to order the proper ammunition, even though only HE may be actually used in the cannon for safety reasons. He also is told to fire only a limited number of rounds at a target, even thought he does not get a hit.

After the crew returns to the starting point it is critiqued by the conducting officer before all other available crews. With several tanks and several conducting officers, maximum use can be made of the range. About six targets on a run is sufficient. More than one run is desirable for each crew. Its improvement during subsequent runs will be readily noted. It is easy to grade the crews relatively and to foster considerable competition within a platoon or company. The crews take great interest in this type of firing.

Safety Officer. The conducting officer is also safety officer. He designates targets which have such a relative position to the tank that the firing will take place within the allowable firing limits.

Firing by Tank Destroyers. While this type of firing is probably less applicable to tank destroyer crews, they will receive considerable benefit from the same course of instruction and firing.

RECORD OF TANK CREW COMBAT FIRING

Place_____ Date_____ 194 .

Tank Comdr_____, Gunner_____.

Driver_____, Loader_____.

Bow Gunner_____

TARGET RECORD

Target Order	Type Target (Trk, Tk Doughs etc.)	Range	Direction (Front, Rt, Left Rr, etc.)	Time to fire 1st shot or burst	Sensing	Time to fire 2d shot	Remarks as to hits, etc.
1							
2							
3							
4							
5							
6							
7							
8							

Comments

a. Tank Comdr's Commands: _____

b. Actions of Driver: _____

c. Actions of Gunner: _____

d. Actions of Loader and Bow Gunner: _____

e. General Comment on Crew: _____

f. Any Malfunctioning of Tank: _____

_____

Conducting Officer

Critique will be conducted before remainder of company on return to Starting Point.

Cavalry in World War II

by Major Hal D. Steward*

A TOTAL of 91,948 men served with the Cavalry during World War II.

This number was reached when cavalry was at its maximum strength on May 31, 1945. Further statistics on the numbers of officers and enlisted men who served both in the continental U. S. and overseas are given in the table below.

A total of 73 nondivisional cavalry units were in active service between December 7, 1941 and May 30, 1946, compared with only 20 such units still in active service on March 30, 1946. These 20 units were comprised of eight Mechanized Cavalry Groups, 11 Mechanized Cavalry Reconnaissance Squadrons, and the U. S. Military Academy Cavalry Squadron at West Point.

Of the original 73 nondivisional units, 13 Mechanized Cavalry Groups and one unattached Cavalry Reconnaissance Squadron fought in the European Theater of Operations. (A mechanized cavalry group was composed of group headquarters and headquarters troop and two attached mechanized cavalry reconnaissance squadrons.)

Groups were assigned to armies, and habitually attached to corps. Most of these attachments were permanent. Corps frequently attached these units, for operations only, to divisions—usually Infantry Divisions.

The 13 Mechanized Cavalry Reconnaissance Squadrons fought in the ETO as organic units of Armored Divisions (light), and two Armored Reconnaissance Battalions as organic units of Armored Divisions (heavy).

Forty-two Cavalry Reconnaissance Troops fought in the ETO as organic units of Infantry Divisions.

The only Cavalry Division to fight in World War II as a complete unit was the 1st Cavalry Division, which fought in three major campaigns in the Southwest Pacific, and now is occupying Tokyo.

During the fighting in Europe, mechanized Cavalry units were usually assigned one of the five following types of missions: (1) Offensive combat, including attack as well as pursuit and exploitation. (2) Defensive combat, including defense, delaying action and holding of key terrain until arrival of main forces. (3) Reconnaissance. (4) Security for other arms, including blocking, moving and stationary screening, protecting flanks, maintaining contact between larger units and filling gaps. (5) Special operations, including acting as mobile reserve, providing for security and control of rear areas, and operating as an army information service. The accomplishment of reconnaissance missions normally involved offensive combat as frequently as did the accomplishment of security missions.

Types of missions assigned to mechanized cavalry groups, based on 12 such units in combat were: defensive combat, 33%; special operations, 29%; security, 25%; offensive combat, 10%; and reconnaissance, 3%. Percentages are approximate.

From surveys, the following striking points were revealed: (a) The performance of pure reconnaissance missions by mechanized cavalry groups was rare; (b) the performance of defensive missions by mechanized cavalry groups was common; (c) the ratio of days of primarily mounted employment was about 1.8 to 1; and (d) for performance of offensive, defensive and security missions, it was normal for the mechanized cavalry groups to be reinforced by a battalion of field artillery, a battalion of tank destroyers and a company of combat engineers.

STRENGTH OF THE CAVALRY ARM

May 31, 1945 (Peak Strength)	Officers	Enlisted Men	Total
In Continental United States	2,845	19,298	22,143
Overseas	6,087	63,718	69,805
Total Os or EM	8,932	83,016	
GRAND TOTAL			91,948
March 1, 1946	**Officers**	**Enlisted Men**	**Total**
In United States	3,989	9,065	13,054
Overseas	1,967	17,646	19,613
Total Os or EM	5,956	26,711	
GRAND TOTAL			32,667

*Press Branch, War Department Bureau of Public Relations.

V-2---THE "ATOM

5,000-Mile Range Is Goal

A SELF-PROPELLED Atomic Bomb with a 5,000-mile range is the goal of the Army Ordnance Department. Daily at the White Sands Ordnance Proving Grounds in New Mexico, Ordnance experts are working toward the development of such a bomb, which will in all probability prove to be the most potent war weapon in the world.

The Ordnance Department is getting its start on the weapon from captured German V-2 bombs, which at present are self-propelled and have a maximum range of about 200 miles at a velocity of 2,620 feet per second, which is about the speed of a .30 caliber rifle bullet.

By research and development, the Ordnancemen hope to increase the range of this bomb to the previously mentioned 5,000 miles, and load its warhead with atomic explosives. Further hopes of Ordnance experts are that the bomb can be propelled by atomic energy instead of its present fuels of alcohol and liquid oxygen.

When Navy men heard about this potential weapon, one Naval officer remarked, "If this proposed weapon is developed to expectations, the Navy will have to pick up its marbles and go home."

First American Firing of V-2

On April 16, 1946, at White Sands, New Mexico, the first American firing of the German V-2 bomb took place. The firing was reasonably successful despite the fact that one of the bomb's fins fell off a few seconds after it had bolted into the air. The test established the fact that American Army Ordnance personnel are capable of firing the monstrous bomb.

The V-2, which was used by the Germans in the latter stages of the European war, is 46.05 feet long, and weighs 28,380 pounds when fully fueled and loaded. Unloaded it weighs 8,816 pounds. The bomb's diameter is 5 feet, 4.9 inches. In its present stage, the V-2 fully loaded with its 2,200-pound warhead will make a crater in the earth about 35 feet in diameter and 18 feet deep. It can be fired vertically and is capable of reaching an altitude of approximately 100 miles.

A crew of about 28 men is needed to set up and fire the V-2. Two men are required for the firing board; five men on propulsion; seven on the trailer on which the bomb is carried; four on the electrical port; and 10 men to fuel the bomb.

Ninety minutes is required to put the bomb into position and fire it. This also includes prefire testing. For safety, personnel must be at least 100 yards from the bomb when it is fired, but a greater distance is preferable.

In its present stage, the V-2 roughly compares in

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C AGE" WEAPON

*by Major Hal D. Steward**

damage-power with the American 4,000-pound aerial bomb. The weight of the actual explosive in the warhead is 2,200 pounds. The explosive used is Amotol, the same as employed by the American Army.

V-2 is accurate to within 200 yards of a designated target. Its cost is approximately $20,000.

Range Almost Unlimited

The disadvantage of the bomb at present is its great weight, which is caused by the large amount of fuel it must hold. Until a substitute fuel can be found to propel the bomb, it will be almost impossible to increase its range. Should it be possible to use atomic energy for propulsion as it is hoped, the bomb will have an almost unlimited range.

If it can be propelled by atomic energy, and carries an atomic warhead, the use of aircraft in war would be practically outmoded. It then would be possible to send thousands of these bombs by radio control over a designated target, and maintain an even greater accuracy than is now possible from aircraft.

With such a bomb the only mission ground troops would have is that of occupation.

The United States is not the only country endeavoring to develop this bomb. Most major world powers now are employed in research and development on this "Atomic Age" weapon that has every possibility of becoming the most dangerous war weapon the world has ever seen.

Experiments on the V-2 are being conducted in the middle of the New Mexico desert, 85 miles by road west of El Paso, Texas. The area is level and the small garrison camp can be seen from a distance of 10 miles before it is finally reached. The camp is commanded by Lieutenant Colonel Harold R. Turner, an Ordnance officer with years of engineering experience.

The spot at which the V-2 is actually fired is nearly 10 miles from Colonel Turner's camp. It is known as "The Technical Area," and is encircled by a barbed-wire fence which has armed guards at each entrance. Entrance can be obtained only with a pass signed personally by Colonel Turner.

V-2 Firing Control

Inside the technical area, besides the base from which the V-2 is fired, is a cement blockhouse with walls of cement 10 feet thick, and a ceiling which is 27 feet thick. Inside this concrete house are the electrical instruments that fire the V-2 and control its flight.

Once the bomb is fired its flight is followed by radar units which have been set up at many places on the New Mexico desert. Every effort is made not to lose track of the bomb for one moment while it is in flight. During the first firing test it was possible for the Ordnance technicians to follow the bomb from the time it was fired until it plunged into the ground several seconds later and exploded.

Major Herbert L. Karsch of 2409 South St. Louis Street, Tulsa, Oklahoma, a petroleum engineer in civilian life, has direct charge of the firing of the V-2 bomb. He probably knows more about the V-2 bomb than any other officer in the American Army.

The V-2 is carried and put into firing position by a Mono-wagon, a trailer invented by the Germans which has hydraulic levers that lifts the V-2 into a vertical position.

When a firing of the V-2 is scheduled, Ordnancemen in jeeps warn all the near-by ranchers.

During the next few months several V-2s are to be set off in the New Mexico desert in experiments that may develop the V-2 into the world's most powerful weapon.

And what will be the defense against this weapon? That is anybody's guess. When the author asked one high-ranking antiaircraft officer what would be used as a defense against this potential atomic weapon, his answer was: "That's a good question."

Picture shows Field Marshal Montgomery, bending, with other British officers examining the remains of the jet unit of a V-2 which landed in a field in Belgium. The bomb travels 30 to 60 miles above the earth.

British Official Photo

*Press Branch, War Department Bureau of Public Relations.

Horses Were Used

by Captain Raymond F. Baker

The place–San Stefano.
The date–August 19, 1943.
The event–the formation of a horse reconnaissance troop.

HARDLY had the Sicilian Campaign ended victoriously on August 18, 1943 before Lieutenant General (then Major General) Lucian K. Truscott, Jr., commanding general, Third Infantry Division, directed that all animals which had been gathered by various units of the division for pack transportation during mountainous operations be assembled at San Stefano, Sicily. Mules and horses totalling 120 were collected and three officers and 16 enlisted men were assigned to care for them.

General Truscott issued orders on August 19 creating a mounted reconnaissance troop. An improvised table of organization based upon WD T/O&E 2-17 was used, based on anticipated operations, and equipment that was available. A troop of five officers and 175 enlisted men was authorized. In addition, a mule pack train was to be formed in four platoons of 50 mules each, one officer and five enlisted men per platoon, or a total of four officers and 20 men.

The Third Division was ordered to Trapani for reorganization and training a day later. The mounted elements were assigned an area covering about 10 acres, on which were olive groves and a salt flat that made the location ideal for animal "housekeeping."

Volunteers were called for to form the unit—and one horse-trained cavalryman was found in the entire division. The remainder of the men recruited were from the cowboys, ranchers, city youths and farmers of the infantry, artillery and engineers. Officers were drawn from division units as they could be spared.

Animals were collected from the Italian cavalry stables in Palermo, from farmers and natives who had seized animals abandoned by retreating German and Italian forces, by requisition, and through Allied Military Government facilities. Equipment was gathered from warehouses in Messina, Palermo and Trapani. The only American equipment initially used was 75 Phillips cargo packs, which were flown in from storage in Africa for use by the pack train.

The reconnaissance troop was organized into three reconnaissance platoons and a weapons platoon. Troopers were given their choice of individual weapon—carbine, '03 rifle, or BAR. We finally settled on '03 rifles and four BAR's to a reconnaissance platoon. The weapons platoon carried six light machine guns, two .50 caliber machine guns, and two 60mm mortars. Only one radio was employed—a SCR 284 pack set, hand generated—for communicating with the division headquarters. With the troop, hand and voice signals were used.

Training was hurried. First priority was given to conditioning the men and animals, and teaching the new horsemen the rudiments of equitation and care of their mounts. Cavalry combat tactics were practiced whenever possible. Hasty firing courses were erected along various mountainous routes used in conditioning the men and animals. The troop practiced patrolling the roads and mountain passes. On approaching the target area, platoon and troop attacks were executed. Stream fording, map and compass reading and cross-country movements were practiced constantly. All training was conducted with full field equipment and combat loads. Often the troop remained away from its base

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***(Captain R. W. Baker is an instructor in the Tactics Department of The Cavalry School, Fort Riley, Kansas. He was an enlisted man in the 3d Cavalry Regiment at Ft. Meyer, Va., from 1926 to 1938 and served in Troop F while Lieutenant General (then Captain) Lucian K. Truscott commanded Troop E. Captain Baker was with the 102d Infantry Regiment in Algiers in 1943 when General Truscott called for him to form the mounted elements of the 3d Infantry Division in Sicily. He served through the Italian campaign and later commanded the 3d Division reconnaissance troop in France and German. His article is the first account of the mounted troop's action which has become available from a member of the unit.*—Editor's Note.)**

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one or two days. By the third week, it was possible to select noncommissioned officers.

The packers, formally called the 3d Provisional Pack Train, were organized into four platoons and were attached to the troop. Personnel learned to pack and adjust loads, and quickly picked up a broad knowledge of the characteristics of mules and their care.

After a month's arduous training in 12- to 16-hour days, the new animal units were tough, and hard. They could move long distances and arrive fit to fight.

The troop, known as the 3d Provisional Reconnaissance Troop, Mounted, to distinguish it from the mechanized reconnaissance troop, was composed of five officers, 126 enlisted men, and 143 horses on September 16. The pack train consisted of four officers, 25 men, and 349 mules. It was decided that until the reconnaissance troop obtained its 50 additional men, the pack train would, in addition to operating the supply train, transport the reconnaissance weapons and equipment so that the riflemen could be at maximum fighting strength.

The organizations loaded into two LSTs at Palermo, Sicily, on September 18, just one month after the activation order was issued. Six inches of sand was spread on the bottoms for stable bedding, and a relay of men sprayed the animals with two-inch fire hoses to keep them comfortable during the hot crossing. We debarked at Battipaglia, Italy, late September 19 and were trucked to an assembly area near Monte Carvino Revello.

Orders were received to organize a mountain artillery battery of four pack 75mm guns. Personnel was furnished by the division artillery battalions, and 125 mules were assigned to the unit, the 3d Provisional Pack Artillery Battery. An original cadre of 16 enlisted horse-and-mule tenders at San Stefano had ballooned into a fair-sized squadron which comprised a powerful and mobile unit for mountain operations.

The first reconnaissance mission was performed on September 21: "Reconnoiter roads lanes and draws approaching Acerno, Italy."

Mines, blown bridges and rugged terrain slowed the advance of the infantry, but proved no barrier to the mounted troop which was able to cut across country at will. The main road, for instance, was so heavily mined for three and a half miles that no vehicle could travel until the engineers cleared the road, an operation which lasted four hours. All avenues were reconnoitered without mishap. Information regarding roads, mountain passes and terrain, and absence of enemy was sent to the division.

The troop then was instructed to reconnoiter hills surrounding Acerno. This assignment consisted of scouring the hill mass beyond town, scouting out draws, possible observation points and likely defensive positions. One of our patrols ran into enemy fire. The troop was immediately organized into a series of strong point positions in order to maintain contact. Several horse-and-foot patrols were sent out to determine the location of the enemy's flanks, his composition and strength. A fairly accurate estimate was made from patrol reports and observers.

Contact was maintained until the arrival of the 1st Battalion, 7th Infantry, which relieved the troop in position. From the information furnished, the battalion was disposed for an attack. The mule pack train swung into action and supplied the infantrymen during a successful three-day engagement.

Mountain operations continued throughout the rest of September, 1943, about four days. Throughout the period, the troop led the infantry regiments on the 39-mile division advance from Acerno, through Montella, Volturara, Atripalda and San Maria. It descended from the mountains only to reconnoiter and pass through the towns of Avellino, Maddaloni, and Caserta.

A breathing spell was afforded at Caserta, when preparations for crossing the Volturno were necessary before a further advance. The time was used in shoeing, caring for animals and equipment, readjusting personnel, weeding out unsuitable animals, and obtaining replacements. By crossing time, the mounted force was in tip-top condition.

Mounted troops crossed the river in the wake of the 15th Infantry at Triflisco, and moved to the town of Villa San Crose, October 13, 1943. The pack artillery went into position as support for operations of the reconnaissance troop. The troop in advance of the 1st Battalion, 7th Infantry, moved toward Marjorano, swung wide of a mountain which it was impossible to climb within the time schedule, and approached Marciano, a small village.

At the edge of town, a stone wall, a stone house and two haystacks in a field was observed—a likely enemy position. Mortar fire that was thrown in ignited one of the haystacks, and stirred up a hornet's nest of enemy, estimated at 75 men armed with machine guns, machine pistols and rifles. Our "peashooting" artillery and the troop riflemen killed 26, wounded five, and captured nine of them. Our losses were one killed and eight wounded. The door now was opened for the infantry to advance to their objective unmolested.

Following this engagement, the troop paced elements of the division to the town of Dragoni. Ordered to the left flank of the division, the troop cut five miles across country to Rocca-Ramona. Upon arrival at posts of observation, the artillery was placed in position to support the troop's attack on the town. Twice the troop went in, and twice it came out. Because of enemy superiority in men and firepower, our force could not hold the town. The 2d Battalion, 15th Infantry, arrived and Major General (then Brigadier) William W. Eagles, commanding the regiment, ordered a coördinated attack. This time the town was held and several counterattacks were repulsed.

The area was now cleared of enemy, and so the troop was ordered into rest for a day at Riardo. Under constant enemy artillery fire, the troop shoed animals and performed other "housekeeping" details attendant to horse operations.

The following day, the troop seized and held Poza, about eight miles away, without encountering the enemy.

From Poza, reconnaissance was pushed west and north. One of the reconnaissance patrols discovered the city of Roccamofina, in British territory, was clear of enemy. A message was dispatched to Teano to the commanding general, 56th British Infantry Division, who expressed thanks for the information. He remarked that he was preparing his artillery and infantry for an attack on the town, and that our reconnaissance information had moved his troops forward one full day.

Poza was soon occupied by troops of the 7th Infantry, and the mounted troop was ordered to seize and hold Toro, eight miles from Poza, and directly across Highway 6 from Presenzano.

We received enemy fire from a stoutly defended road block at the edge of Toro, and because the division had several other routes available that were well inside its zone, we by-passed the resistance and moved to Foresto, less than a mile away, which was not occupied by the enemy. The division commander changed our orders and directed us to occupy Foresto, which was a better location for operations than Toro. Both towns were equal in elevation, and vantage points in Foresto afforded complete observation of Toro and enemy installations beyond.

Reconnaissance patrols and observation posts discovered that the enemy installations were comprised of two self-propelled guns and many dismounted men armed with automatic weapons and rifles, which were located just west of Toro. This information was sent to division headquarters, and the following instructions came back to the troop: Establish radio contact with fire direction center; division artillery and observers from the troop will direct fire; the troop will attack Toro following an artillery preparation.

The attack was successful. Enemy casualties were nine killed and wounded. We captured both self-propelled guns, a variety of small caliber weapons, and rations enough to feed the troop three meals. Following the action, the infantry advanced, and division headquarters moved into Presenzano without interference.

The smoke of this scrap had hardly cleared before the troop was ordered into the hills beyond Presenzano to reconnoiter to Mount Cesimo for the 1st Battalion, 30th Infantry. The troop arrived at the base of the 1,300 meter mountain without trouble, and the battalion commander was informed. He immediately sent his Company C forward to seize and occupy the hill. The company stormed the hill twice and was driven back both times because of enemy superiority in numbers and terrain which favored the defenders.

A coördinated attack was ordered, and while the infantry tried the face again, the mounted troop struck deep on a flank. Our mounted men were able to work more than halfway up the mountain with their horses, zigzagging up rocky trails that were extremely difficult for foot troops. From an overhanging ledge on the forward slope of a ridge on the enemy flank, the troop delivered direct machine-gun fire. Our mortars dropped in rounds from the reverse slope of our ridge. The flank finally softened, and was rolled back before the infantry's frontal attack.

Our next mission was to cross Cannavinelle Mountain and reconnoiter the town of San Pietro. This operation climaxed the career of the mounted reconnaissance troop. Sustained operations, lack of facilities for animal upkeep, and inability of replacements to reach the troop, had cut the strength to 76 fighting men. The movement from Mt. Cesimo to the crest of Cannavinelle was executed rapidly and without contact. Darkness came and the troop secured itself for a quiet night.

But at dawn—and from three sides—a mass of German green-grey studded the landscape. (This was going to be one hell of a scrap.)

The troop was well dispersed and in good defensive positions on an arc resembling an egg-end. The four machine guns were in position to cover the entire field. The mortars, at the bottom of the hill, were ready to deliver surprise fire. All men had good cover and plenty of ammunition. No artillery was available. It was to be a small-arms contest.

The first shot was fired at 0645 hours. About noon, the troop passed from the defense to the attack, and by 1500 hours had captured the hill. The score was 65 enemy killed, 29 wounded, and 11 prisoners "in one piece." Our losses were 11 killed, and 14 wounded, two of whom died. Animal losses were 31 horses and mules.

The town of San Pietro was observed but not entered. With the mission partially accomplished, the infantry took over our positions and we were ordered into a defensive position at Ceppagna.

We were withdrawn for a rest on Armistice Day, November 11, 1943. Eight more days of travel put us in a real rest area where the battle weary troopers were happy over a job well done—59 days of continuous action, except for a day of horseshoeing under artillery fire.

Conclusions

1. Horse cavalry can play an important rôle in mountainous terrain which is unsuited to vehicle operation.

2. Its high degree of cross-country mobility gives a mounted unit freedom of action denied all elements except infantry.

3. Coördinated with infantry, horse cavalry develops a shock power which is difficult to overcome before foot elements apply the battering pressure usually required to subdue a stunned enemy.

4. Italy will sustain mounted operations, although few central grain stock piles can be expected. In rural districts, forage is moderately plentiful.

5. Equipment and supplies, such as saddles and horseshoes, present no problems which can not be easily solved by including animal equipment and supplies in regular quartermaster supply lists.

THE HORSE'S PLACE IN OUR FUTURE

by Colonel Fred W. Koester

Regardless of the extent to which it may figure in our postwar Army, there can be little doubt that the horse will have a definite and important part in the future of our nation. Logical reasoning indicates this—facts prove it.

PARADOXICAL though it may seem, scientific advancement, frequently regarded as the natural enemy of the horse, has, in fact, been responsible for the new and increasing importance assigned this animal. Revolutionary developments in transportation, communication, and other fields have greatly altered world affairs. Nations have been brought much closer together. There is little or no opportunity for isolationism. Wars, instead of being conflicts between two or a small group of nations and confined to rather local theaters, have now become global affairs with all nations directly or indirectly involved. Instead of armies being largely composed of professional soldiers, nowadays everyone, without regard to age, sex, or station, becomes a soldier, actual or potential. If they don't serve on a fighting front, they will likely be engaged on the home front but, in any case, they must be prepared for service.

In such a world, the physical fitness and aptitude of our citizens become of paramount importance. To build and maintain a strong, vigorous, active manhood and womanhood is both a necessity and an obligation. Because it involves our national security, the obligation is properly that of the agency charged with our national defense.

The late war taught us that our average present-day American can stand considerable physical improvement. Modern life with its abundance of luxuries and conveniences is not conducive to physical fitness and ruggedness. Something is necessary to get our people out of automobiles and airplanes, off the city streets, and into the country where they may develop the stamina, self-reliance, and mental alertness that come from spending some time in the open. Now, while no single medium can accomplish this objective, it is certain that none can contribute more to the physical betterment of more people in more localities and under a greater variety of conditions than can the horse.

Why is this true? To begin with, the horse is a great motivating influence. It accounts for a multitude of wholesome sports and recreation such as horse shows, hunting, hunter trials, polo, jumping, schooling, all forms of racing—including harness, flat, steeplechasing, etc., rodeos (which in 1945 ranked third among all amusements in aggregate attendance), trail rides, and a wide variety of other equestrian competitions. These engage or attract people of all ages, both sexes, all colors, all creeds, all stations, and all localities, in all climates, and at all times of the year. It has been conservatively estimated that some 45,000,000 Americans have regular contact with horses, and thus derive some physical betterment or mental relaxation from the association. Our horse "industry" reaches into every state, every county, and every city or hamlet, and has an estimated aggregate value of more than $2,000,000,000. Thus,

there is ample factual basis for emphasizing the importance of the horse to the physical welfare and contentment of a large proportion of our citizens.

There is other concrete evidence too. For example, California, recognizing current horse trends as well as its obligation to its people, recently appropriated $300,000 to begin work on a state-wide trail system, 1,500 miles in length which, when completed, will be without parallel either in this country or abroad. Other states are contemplating similar measures. Again, hundreds of organized horse groups such as sheriffs' posses, riding clubs, city, county and state horsemen's associations and breeder associations, are forming in all parts of the country. It is reported that 52 horse magazines, with national or semi-national circulation, are published in this country. All forms of equestrian sports, most of which were dormant during the war, are returning either in an expanded form or with programs for postwar expansion. Attendance figures at race meetings, rodeos, and other events featuring horses, are breaking all existing records. Prices paid at breeders' sales, etc., are increasing gradually.

These developments have had a decided effect on the horse industry. The riding horse seems to be replacing the draft horse in relative importance. Some fewer but decidedly better horses are being raised. Selective breeding is no longer a goal but an actuality. Standards of horse husbandry have been tremendously improved. The better horses being raised will have a greater all-round utility both for peacetime needs and wartime potentialities. This is of military significance.

Whether we have only a few or no mounted combat elements in our postwar Army, the horse has a definite value as a training adjunct for certain of our military personnel. At some service schools and in some ROTC, National Guard, and other units, horses may be employed profitably. Then, too, we should not lose sight of the fact that Generals Patton, Wainwright, and Truscott; the entire 1st Cavalry Division, and many other illustrious leaders and soldiers of World War II, no matter where or how they fought, were trained in the saddle. A system and a medium that boasts of such products surely must have future value.

The changes which have taken place, as well as the outlook for the future, all enhance the importance of the Remount Service. Originally organized to accomplish necessary procurement as well as administer the Army Horse Breeding Plan, the Remount Service in recent years has become the principal liaison agency between the government and the people of the country in horse matters. As the importance of procurement has decreased, that of breeding has steadily increased.

The Army Horse Breeding Plan inaugurated by a far-seeing Congress in 1921 has made a tremendous contribution to the economic wealth of the country. From a modest beginning of 159 stallions standing in 1921, the number steadily increased until 1942 when more than 700 stallions were in service. Between 1921 and 1944, more than 300,000 mares were bred to Remount stallions and produced over 200,000 foals, most of which, except for normal attrition, are in use in the United States today, principally on ranches and farms and for other essential purposes. These are estimated to have an aggregate value of more than $30,000,000. There are many figures available to prove that the Remount Program has been most economical and has given the taxpayers a maximum return for a minimum expenditure.

The Army Horse Breeding Plan, as well as many other Remount activities, serves a dual purpose. While meeting potential military requirements, it also sustains the quality and quantity of the nation's horse resources. It is directed toward reconciling and integrating our national rural economy with possible future security needs while at the same time, seeking to maintain sound rural economical health and balance as one of our national military resources. It recognizes that horses and mules are a by-product of the ranch and farm as is the development of personnel trained to use them. This is a matter of military importance that should not be overlooked.

The Remount Program, too, takes cognizance of the fact "that the outside of the horse is good for the inside of a man," and that widespread use of horses to add to the pleasure, interest, and above all, physical well-being of our manhood and womanhood is an essential and worth-while step in preserving our manpower resources. Again, the program recognizes that, although the need is diminishing in some fields, there is nevertheless a continuing requirement for horses of suitable type in many phases of agriculture, in our great cattle industry, for use in administering our forests, and in many other essential fields where mechanization cannot, for a variety of reasons, replace the horse.

The Remount Service has an international importance too. First, it is an appropriate agency for coordinating the horse and mule requirements of other nations with our own needs and production capabilities. In this connection, it is well to remember that, regardless of scientific developments in our own country, many foreign nations are geared to an economy based on use of animal power and transport. There is no immediate prospect that they can switch to mechanization either with our help or that of others. Finally, in matters involving the defense of the Western Hemisphere, many military authorities agree that there is and will continue to be at least well into the predictable future, a widespread necessity for horses for military uses in most of South and Central America. The principal source for meeting such requirements is the existing pool of fine horses of military type, largely the products of the Remount Program which exists in the United States today. This supply will continue to exist only if the pool is kept filled by a yearly increment of horses such as resulted and may continue to result from the Army Horse Breeding Plan as now operated.

Editorial Comment

To the Editor of the CAVALRY JOURNAL:

FROM my seat on the sidelines I hear various and sundry rumors of the merging of the remnants of the Cavalry with the Armored Force to be called perhaps Cavalry or Armored Cavalry.

In view of the widespread misconception of the events which contributed to the establishment of the provisional Armored Force, I believe it is a proper moment to release the historical truth. Here it is in copies of official communications which tell the complete story.

JOHN K. HERR,
Major General, Retired.

322.02

October 3, 1939

Subject: Expansion of Mechanized Cavalry

To: The Chief of Staff

1. In view of my responsibility to advise the Chief of Staff in matters pertaining to Cavalry, the following is submitted.

2. Since the employment of mechanization in Poland apparently has been on mobile, hard-hitting, flanking missions, and in rapid exploitation of the breakthrough created by the assault of infantry and less mobile troops (all typical cavalry missions); and since such similar employment is visualized for any war of movement in this hemisphere, it is believed that any expansion of mobile, fast-moving mechanization should be charged to the Cavalry arm of the service for development and leadership. It is believed that this should begin immediately and center about the 7th Cavalry Brigade, which has already most of the essential elements needed for expansion.

3. *a.* It is therefore recommended that the 7th Cavalry Brigade be expanded into a Mechanized Cavalry Division as indicated in the accompanying organization charts. This expansion more than doubles the striking power of the present brigade by increasing the number of combat cars from 112 to approximately 500, making it fully the equal of the German Armored Division, while at the same time retaining the greater flexibility in organization inherent in the American Brigade (Charts A, A-1, A-2, A-3).

b. First Increment

In order to accomplish the expansion of the mechanized cavalry brigade into a division with a minimum of time, it is recommended that the delivery of vehicular equipment set up in both 1940 and 1941, for the proposed augmentation of the brigade, be advanced so that this equipment will become available in the calendar year 1940 (Chart B).

c. Second Increment

It is also recommended that this office be authorized to submit supplementary estimates for the additional equipment involved in the further expansion of the 7th Cavalry Brigade into a division and that this equipment when authorized, also be given the priority necessary to insure its delivery in the calendar year 1940 (Chart C).

4. As soon as this first Mechanized Cavalry Division shall have been organized with the requisite personnel and material, it is recommended that the organization of another similar mechanized cavalry division be started without delay.

5. Following these two mechanized cavalry divisions, and if it becomes apparent that the Army of the United States is to be increased to the size of four Field Armies or thereabouts for participation in war, it is recommended that two additional mechanized cavalry divisions be authorized so that the resulting proportion will be one mechanized cavalry division to each Field Army. Inasmuch as the training of mechanized cavalry and the procurement of its equipment require considerable time, consideration should be given these last two mechanized cavalry divisions in the initial stages of any planning for a Four Field Army national defense force.

6. *Personnel*

a. As soon as the expansion of the 7th Cavalry Brigade into a division has been approved it is recommended that all necessary personnel for this increment be ordered to Fort Knox, Kentucky, for training.

b. Immediately upon delivery of the equipment for the first Mechanized Cavalry Division, it is recommended that 25% of the personnel necessary for the succeeding division be sent to Fort Knox, Kentucky, for training with the then available equipment, in order to prepare this cadre for the organization of the second mechanized cavalry division in a minimum of time.

c. Upon the authorization of each successive mechanized cavalry division, it is recommended that this same practice be followed; that is, ordering 25% of the personnel of each successive division to Fort Knox, Kentucky, for training as specialists and key men.

d. With reference to this increased personnel for Fort Knox, Kentucky, conference with the Commanding General of the 7th Cavalry Brigade, this date, indicates that facilities exist on that reservation for the initial increase as indicated.

7. The importance of the immediate expansion of mechanized cavalry in the United States Army is indicated by the wide use of German mechanization in Poland. Although the details of this employment are not yet known, it is evident from all reports that German mechanized forces were extensively employed in this rapid and decisive campaign. In view of this fact it is believed that four mechanized cavalry divisons, as

indicated in this project, would provide a reasonable amount of this essential mass of highly mobile, hard-hitting forces in event this country becomes involved in war.

8. The designation of the 7th Cavalry Brigade at Fort Knox, Kentucky, as the nucleus of this expansion is based upon seven years experience in mechanized cavalry at that post.

9. It is recommended that the personnel requirements for this project be considered in any and all progressive augmentations of our ground forces. Inasmuch as mechanization is designed to increase the scope of existing arms and not to replace them it is not considered that personnel should be provided from any existing units of any arm but should be in addition thereto. It is believed that Congress and the American public, when faced with the realization that the United States lags far behind all first-class powers of the world in quantity of mechanization, will be quick to favor any emergency measures necessary immediately to obtain additional personnel as well as equipment for a substantial increase in our mechanized strength. When consideration is given the fact that except for a few scattered tank companies and two or three incomplete battalions, our entire army includes only one mechanized brigade, as contrasted, for example, with at least 10 German armored divisions, the urgency of this situation cannot be escaped.

10. In conclusion, it is believed that existing military thought in the United States with reference to what constitutes the correct proportion of mechanized cavalry in a balanced and mobile force, should now be revised in order to accord this type of cavalry the importance and size it merits.

11. The Commanding General, 7th Cavalry Brigade, has been consulted and concurs in the above. The provisions for the early training of personnel are his specific recommendations and are considered by him to be especially essential for an orderly expansion.

J. K. HERR,
Major General, U. S. Army,
Chief of Cavalry.

(The memorandum of G-3 referred to below asked for comments in the question of establishing an armored corps.)

June 3, 1940

MEMORANDUM FOR THE ASSISTANT CHIEF OF STAFF, G-3

Subject: Mechanization

1. Reference your memorandum of June 1, 1940, on the above subject (C-3/41665), the following comments and recommendations are submitted:

2. *Comments*

a. The present policy of assigning mechanization to the several arms is sound.

b. Lack of funds, not the absence of a separate corps, has delayed the expansion of mechanized units. In this connection attention is invited to my memorandum to the Chief of Staff on October 3, 1939, subject: Expansion of mechanized cavalry (322.02), urging the immediate and orderly expansion of the 7th Cavalry Brigade into a mechanized division of the same approximate power as the German Panzer Division to be followed by the successive formation of three similar divisions.

c. Examination of the employment of German armored divisions both in Poland and France shows clearly that they were used on Cavalry missions, particularly exploitation after the breakthrough. There is no valid reason for setting up a separate corps for the development and training of units to be used in the execution of cavalry missions.

d. The corps reconnaissance regiment, as well as the mechanized cavalry brigade, has been developed by the cavalry, is proving successful, and should remain assigned to that arm.

3. *Recommendations.*

a. That no separate Armored Corps be established.

b. That the 7th Cavalry brigade be designated a mechanized cavalry division and expanded without delay.

c. That additional mechanized cavalry divisions and corps reconnaissance regiments be provided in proportion to successive increases of the army.

J. K. HERR,
Major General, U. S. Army,
Chief of Cavalry.

320.1

December 7, 1940

MEMORANDUM FOR THE ASSISTANT CHIEF OF STAFF, G-3

Subject: Organization of the Armored Force, Your G-3/41668, AG 320.2 (10-2-40), November 19, 1940

1. I do not concur with the recommendations of the Assistant Chief of Staff, G-3.

2. For obvious reasons my remarks will be confined to his recommendation that the Armored Force be established as a separate arm of the service without further delay. As a basis for my conclusions and recommendations, I will review the facts bearing on this situation in chronological sequence.

3. In the report of the Chief of Staff, U. S. Army, 1932, the following broad policies governing the development of mechanization in the Army were announced as follows: "Every arm is authorized to conduct research and experimentation with the view of increasing its own power to perform properly the missions it has been especially organized and developed to carry out. Every part of the Army will adopt mechanization and motorization as far as practicable and desirable." In conformity with this policy the Cavalry first set up one mechanized cavalry regiment, which was later ex-

tended into the 7th Cavalry Brigade, Mechanized, composed of two mechanized cavalry regiments, with the necessary staff, headquarters unit, and attached supporting arms, including artillery.

4. Continuing this sound development step by step the Chief of Cavalry on July 8, 1937, recommended the formation of a cavalry division, mechanized. This was approved by the War Department for planning purposes only; that is, it was regarded as a paper organization and no equipment was authorized. This status continued until 1939, when the present Chief of Cavalry in the hearings before the War Department Budget Advisory Committee on the equipment to be procured in 1940 asked for all the matériel and equipment necessary to increase the 7th Cavalry Brigade, Mechanized, to the division strength of about 3,000 set forth in the organization approved for planning purposes, amended by conference and concurrence with the Commanding General, 7th Cavalry Brigade. This request was supported by the fact that the then Chief of Staff had stated before Congressional committees that this brigade would be increased to a division. The Budget Advisory Committee was about to approve the estimate when the following development threatened to sabotage the project.

5. The Assistant Chief of Staff, G-3, having submitted a memorandum to the Chief of Staff, recommending approval in principle of the expansion of the 7th Cavalry Brigade, Mechanized, into a mechanized cavalry division along the lines previously indicated, informed the Chief of Cavalry as follows:

May 12, 1939

MEMORANDUM FROM THE A.C. OF S., G-3

Subject: Mechanized Cavalry Division (G-3/6541-Cav-36, May 2, 1939)

The Chief of Staff disapproved the action recommended in the memorandum cited above, which is returned herewith. The Chief of Staff is opposed to further expansion of the mechanized brigade into a mechanized division, and desires that any planning towards further expansion of mechanized units be along the lines of an additional brigade in general similar to the present 7th Cavalry Brigade.

By direction of the Chief of Staff:

(s) H. R. Bull,
Lt. Col., General Staff
Secretary, General Staff.

6. As a consequence of this the Assistant Chief of Staff, G-4, informed the Chief of Cavalry that, inasmuch as the Chief of Staff had disapproved the formation of a mechanized division, the matériel and equipment asked for by the Chief of Cavalry to equip the division would not be approved by the Budget Advisory Committee. The Chief of Cavalry then, by personal interview with the Chief of Staff, obtained the concession that he really wanted all this equipment no matter what the development might be. By personal interviews with the Assistant Chief of Staff, G-4, and the Assistant Chief of Staff, G-3, after stating the view of the Chief of Staff, the Chief of Cavalry was able to save this equipment which finally passed, not only the War Department Budget Advisory Committee, but the Bureau of the Budget. This equipment was the first equipment available in the present expansion and would not have been available except for the efforts of the Chief of Cavalry.

7. The next step to further the development of mechanized cavalry was the result of European developments in mechanization as shown in combat. Beginning in 1938, when he came into office, the Chief of Cavalry had initiated an intensive study of all European mechanization. He had requested and secured from the Assistant Chief of Staff, G-2, up-to-date summaries of the mechanization of all leading powers. In addition, he had submitted questionnaires which were sent to military attaches to secure data to fill in the gaps. This included every phase of mechanization; organization, training, equipment, armor, armament, and everything that could be learned. The organization of the Panzer Division was studied in the most complete detail. The Chief of Cavalry had also secured the detail in his office of officers from mechanized cavalry who were completely familiar with all the details of mechanization and training in the 7th Cavalry Brigade. One of these officers had been the brigade executive and G-3 for the preceding three years and had written every problem executed by this force. Complete files were set up and kept up to date. In the summer of 1939, the Chief of Cavalry called into conference with him the Assistant Chief of Staff, G-3, and Colonel Truman Smith of G-2, who was intimately familiar with the details of German organization, and endeavored to inform thoroughly the new Assistant Chief of Staff, G-3, as to the organization and purposes of the German Panzer Divisions and to sell him the idea that there was a great likelihood, in view of the international conditions, that this country in any expansion of our forces, would need American mechanized divisions more or less similar to the German Panzer Division. It was also impressed upon the Assistant Chief of Staff, G-3, that these divisions were really armored cavalry and that any development in our Army of such mechanized elements should naturally and properly be under the supervision of the Chief of Cavalry. He appeared to concur.

8. Immediately after the Polish campaign, the Chief of Cavalry, on October 3, 1939, submitted to the Chief of Staff a memorandum, subject: Expansion of Mechanized Cavalry, copy of which is attached hereto, and marked Incl. No. 1. It will be noted that, in this recommendation, the Chief of Cavalry proposed that the deliveries of all equipment for a division of 3,000 men scheduled for 1940-1941 delivery be speeded up for de-

livery in 1940, that he be permitted to submit supplementary estimates for additional equipment necessary to increase the 7th Cavalry Brigade into a division of the approximate strength of the German Panzer Division of about 10,000 men, and that it be given the priority necessary to assure its delivery in the calendar year 1940. Complete charts of recommended organization accompanied this memorandum.

9. It was recommended also that, as soon as the first mechanized cavalry division had been organized with the requisite personnel and matériel, the organization of another similar mechanized cavalry division be started without delay; that following the organization of these two mechanized cavalry divisions, if it became apparent that the Army of the United States was to be increased to the size of four field armies, two additional mechanized cavalry divisions be organized so that the resulting proportion would be one mechanized cavalry division to each field army; and that, inasmuch as training of mechanized cavalry and procurement of its equipment required considerable time, consideration should be given the last two mechanized divisions in the initial stages of any planning for a four field army national defense force. It further stated that the missions of this force were typical cavalry missions and that any such expansion should be charged to the cavalry arm of the service for development and leadership. It also stated: "It is believed that Congress and the American public, when faced with the realization that the United States lags far behind all first-class powers of the world in quantity of mechanization, will be quick to favor any emergency measures necessary immediately to obtain additional personnel, as well as equipment for a substantial increase in our mechanized strength. When consideration is given the fact that, except for a few scattered tank companies and two or three incomplete battalions, our entire army includes only one mechanized brigade, as contrasted with at least 10 German armored divisions, for example, the urgency of this situation cannot be escaped."

10. This was the first concrete recommendation made by anyone, so far as I know, for the establishment of American divisions of this type. No one in the 7th Cavalry Brigade had suggested anything of the sort and were still thinking in terms of the small division of about 3,000 men. It so happened that General Chaffee, then in command of the 7th Cavalry Brigade, was in Washington at the time. This memorandum, with its accompanying tables, had been completed and he was requested by the Chief of Cavalry to confer with him and express his concurrence or dissent. After suggesting one or two very minor alterations, he agreed to concur and the Chief of Cavalry so stated in the last paragraph of his memorandum.

11. Immediately after the submission of this memorandum of October 3, 1939, there began an attempt to prevent the Cavalry from securing control of this development. Although there may have been some who honestly believed in a separate armored force, it is believed that the bulk of this agitation was on the part of those non-cavalrymen, some of whom had served in tank battalions, who saw themselves excluded from gaining high positions in armored corps and divisions. A whispering campaign was begun to the effect that the Chief of Cavalry, being an ardent horseman, would not develop mechanization. As has been shown hereinbefore, there was no foundation in fact to these whisperings. Meanwhile, no official recognition was given to the far-reaching recommendations made by the Chief of Cavalry in the memorandum of October 3, 1939. On the contrary, the G-3 section of the General Staff began to pester the Chief of Cavalry with memoranda requiring him to state where he was going to get the personnel to man the mechanized equipment which was coming up in 1940 and prescribed the restriction that he must get this personnel from the strength which he then had. In other words the idea was to force the break-up of horse regiments to man the very equipment salvaged by the personal intervention of the Chief of Cavalry. Inasmuch as the Chief of Cavalry could see the need in the near future for all the horse cavalry he then had, plus considerably more, in addition to a great expansion in armored cavalry, he resisted this rather petty effort of trying to force him to rob Peter to pay Paul. (See attached copy of memorandum of Chief of Cavalry to the Chief of Staff, April 10, 1940, and marked Incl. No. 2.)

12. Meanwhile, although a separate armored force had been rejected by the War Department on previous occasions, the proponents of a separate force continued to agitate this matter. This apparently came to a focus at the close of the maneuvers in Louisiana in May 1940. Both the Chief of Infantry and the Chief of Cavalry attended these maneuvers. The Assistant Chief of Staff, G-3, failed to invite them to attend a conference which he called to consider the subject of mechanization and to which he invited a few officers of more or less experience in tank battalions and in mechanized brigade.

13. Immediately thereafter in a memorandum of June 1, 1940, the Assistant Chief of Staff, G-3, to the Chiefs of Cavalry and Infantry, subject: Mechanization, copy of which is hereto attached, marked Incl. No. 3, requested their views on a change in the present policy of mechanization, particularly as to the advisability of setting up a separate armored force. Both the Chief of Cavalry and the Chief of Infantry declared themselves to be opposed to a separate armored force. Attached hereto is a copy of the memorandum of the Chief of Cavalry, marked Incl. No. 4. Following are extracts of the report from the Chief of Infantry.

> "The Panzer units are in effect armored cavalry. The Chief of Infantry urgently recommends that no precipitate action be taken in this matter, but that all aspects be given careful consideration. The fallacy of shaping organization on the basis of weapons, rather than adapting weapons to the

mission, is a constantly recurring one. It was seen in the World War in the machine-gun corps of the British Army, which a large group in the American Army wanted to adopt for our service. The present basic policy of tank development was laid down by General MacArthur in his memorandum of May 1, 1931. It was one of the soundest documents ever promulgated by the War Department. It lays down the principle that development of weapons and units should be based on mission."

14. I quote also a paragraph from confidential letter to the War Department, dated September 15, 1939, from the Commanding General, 7th Cavalry Brigade, subject: Some Observations and Recommendations Pertinent to Any Future Expansion and Development of Mechanized Cavalry which may be Contemplated by the War Department, as follows:

"To me, the basic determination of the War Department to develop the mobile mechanization as cavalry and with cavalry conception and leadership, and to develop the immediate tank assistance to assaulting infantry as infantry and by the infantry tank service—which basic determination was confirmed by the Gruber study in G-3 of the War Department—has been again shown, both by the Plattsburg maneuvers and by the German operations in Poland, to be an essentially sound solution under our law and should be continued."

15. On June 5, 1940, in a memorandum to the Chief of Staff, subject: Expansion of Mechanized Cavalry, the Chief of Cavalry renewed his recommendations of October 3, 1939. Copy of this memorandum is hereto attached and marked Incl. No. 5.

16. On June 5, 1940, the Assistant Chief of Staff, G-3, in a memorandum to the Chief of Staff requested that the following named officers be ordered to Washington and report to the Chief of Staff for consultation in connection with organization matters pertaining to mechanization: Brigadier General Adna R. Chaffee, Brigadier General Bruce Magruder, Brigadier General C. L. Scott, and Lieutenant Colonel S. E. Brett. The last named officer announced to all before leaving Fort Leavenworth that he was going to Washington to advocate a separate armored corps.

17. On June 7, 1940, the Assistant Chief of Staff, G-3, issued a memorandum calling for a conference on June 10, 1940, at 10 A.M., of chiefs of general staff sections, arms and services on the subject of armored equipment and organization in the Army. Generals Chaffee, Scott and Magruder and Lieutenant Colonel Brett were present. When this conference was called the Assistant Chief of Staff, G-3, stated that the discussion was wide open, except on one point; i.e., that the Chief of Staff had decided that two divisions would be formed, one at Benning and one at Knox, utilizing the mechanized elements of both Cavalry and Infantry for this purpose. In the ensuing discussion the Chief of Cavalry again expressed himself as being opposed to a separate armored force, stating that the present policy was a sound one, that is, permitting each arm to develop its own mechanization to execute its mission; that there was no doubt the missions of the Panzer divisions were cavalry missions; that he was in no struggle for power, but that the question seemed to be largely whether fast-moving mechanization would be dominated, as in the German Panzer Corps, by men of cavalry training, or whether it would be submerged by having in key positions men of other branches; and that he was aware of certain conspirators, some of them in the General Staff, who had been working all along for a separate armored force chiefly as a means to their own advancement. Lieutenant Colonel Brett was the only one present who directly declared for a separate armored corps. This meeting was adjourned to meet in the afternoon. Word was sent around that it would not meet that afternoon, but some time later when notice would be given. Insofar as the Chief of Cavalry and the Chief of Infantry were concerned no additional meeting was ever held. I happen to know, however, that the four representatives of the 7th Cavalry Brigade and of the tank units who were present at the first conference were called together in a series of meetings and discussions in secret conclaves with the Assistant Chief of Staff, G-3, at which time they apparently wrote their own ticket for the formation of an armored force to be set up as an experimental field organization.

18. On July 10, 1940, a memorandum was issued by The Adjutant General, subject: Organization of the Armored Force, which not only set up an experimental field force of one armored corps, but allotted to the Chief of the Armored Force and the Commander of the Armored Corps practically all the duties of a chief of branch.

19. On July 10, 1940, the memorandum of the Chief of Cavalry to the Chief of Staff (copy hereto attached marked Incl. No. 3), dated June 5, 1940, subject: Expansion of Mechanized Cavalry, hereinbefore mentioned and repeating the recommendation of the memorandum of the Chief of Cavalry to the Chief of Staff, October 3, 1939, was returned by 1st Indorsement as follows:

1st Ind.

"AG 320.2 (6-5-40)
M Ret C

War Department, A.G.O., July 10, 1940—To: Chief of Cavalry

In general, the recommendation of the Chief of Cavalry have been incorporated in the Armored Division organization.

By order of the Secretary of War:
Adjutant General."

20. Thus after more than nine months of delay in a critical world situation the Chief of Cavalry was notified that an armored force was being set up to try to accom-

plish in frantic haste practically the same objective that had been recommended on October 3, 1939, by the Chief of Cavalry to be accomplished in a sane, orderly, and constructive manner.

21. The Assistant Chief of Staff, G-3, now recommends in this basic paper that, because he believes this force has admirably fulfilled its mission of initial organization and has successfully passed through the experimental stages of its existence, in the interest of efficiency it should be legally established as a separate arm of the service. There appears to be nothing in the accomplishments of the Armored Force as such including the establishment of a Force Headquarters, a liaison officer in Washington, a school, a board, and a replacement center, which, given the necessary funds, personnel, and matériel, could not have been accomplished equally well or better through the established agencies of the War Department.

22. So far as the tactical units of the Armored Force are concerned, the armored divisions have not been completely equipped nor have the individual soldiers been fully trained. Least of all have the divisions progressed to the point where they can be tested by exercises and maneuvers to determine whether or not the equipment and organization are satisfactory. I have grave doubts as to whether the changes in armor and armament in the light tank have improved these vehicles for employment as armored cavalry. The light tank of the Panzer division weighs 7½ to 9½ tons. The heaviest armor of this type tank does not exceed 4/5 of an inch. Our light tank, as modified, now weighs 13½ tons, armor thickness 1 to 1½ inches. The German medium tank varies in weight from 20 to 22 tons. The thickest armor is 1 3/5″ and varies to ¾ of an inch. Our present medium tank, as modified, has a weight of 25 tons and armor thickness of 1½ to 2 inches. The proportion of light to medium tanks in the Panzer corps is three to one. The proportion of light to medium tanks in the American corps is a little more than two to one. It has been claimed that the present American light tank is too heavily armored for its present chassis. Other criticisms have been made. It is very unlikely that the American armored division is as mobile as the Panzer division, chiefly because of the heavier weight of the tanks. It is a matter of grave doubt that it will be sufficiently mobile to execute cavalry missions on this continent and in this hemisphere. Before it can be said that this force has successfully passed through the experimental stage of its existence it would seem that all these matters should be thoroughly examined.

23. The Assistant Chief of Staff, G-3, also states that, while the chief of the Armored Force is charged with all the functions of a chief of arm, he is handicapped in the performance of his duties by not having full authority vested in the chief of an arm by the National Defense Act. This is a plain admission that a separate arm has already been set up, without the sanction of the law, or rather by evasion of the law, because the intent of the National Defense Act is to set the metes and bounds of the organization of the Army of the United States and any wide departure therefrom should obviously first receive sanction by legislation.

24. There appear to be two specific violations of the provisions of the National Defense Act: First, that part of Section XVII which states, "Hereafter all tank units shall form a part of the Infantry," Second, that provision of Section XVIII which states that "the enlisted men of the cavalry shall be organized into cavalry units as the President may direct." The two cavalry regiments were organized into two light armored regiments.

25. *Conclusion:* There is no need for an armored force as a separate arm of the Service.

26. *Recommendation:* Before any final decision is made in this matter a more thorough review should be made concerning the progress of the armored force under present direction, to include extensive exercises and maneuvers over all kinds of varied terrain after the armored divisions are presumed to be adequately trained and equipped.

J. K. Herr,
Major General, U. S. Army,
Chief of Cavalry.

* * *

To Former Members of the Armed Service

Quite often we receive letters from our former subscribers telling us that they are now separated from the service and asking if they can still subscribe to the Journal.

Yes, indeed you can. Any civilian can subscribe to the Cavalry Journal. The only difference is that you are not a member of the U. S. Cavalry Associaton, and, therefore, not entitled to a vote in the affairs of the association.

All you have to do is send us your home address, and we will do the rest.

* * *

This issue of The Cavalry Journal goes to press with the name of one of its highly esteemed staff members, Mrs. Evelyn S. Drayton, Book Editor, missing from the masthead.

Mrs. Drayton resigned her position with the Journal early in April, after having served it for several years with: a "military rating of superior." Her new position is with the Army Institute of Pathology, Washington. Her place on the staff is being filled by Mrs. Elizabeth C. Hoover.

Mrs. Drayton was devotedly loyal to the Journal. To her the magazine not only came first, it *was* first —and she was steadfast toward both those ends. In the performance of her tasks, which besides the book editorship included sundry others requiring a meticulous attention, her work was excellent.

For her, in behalf of ourselves and our subscribers whom she served in many ways, we will always wish the very best.

OTHER BRANCHES

Signal Corps Photo

General Jacob L. Devers

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From the Marine Corps

Every great soldier must be an expert in his own specialty—cavalry, artillery, armor, infantry, engineer, or any of the services or combat arms — and have a full, useful knowledge of the other combat arms and services.

The knowledge alone is not enough. It must be up-to-date, and his thinking must be progressive. He must be able to project his plans beyond today's knowledge. He must anticipate, if he is to contribute his full worth to security of our nation.

Consequently, a step like "Other Branches" is a step in the right direction—giving knowledge of other arms and services to our modern soldiers. It can only be as good as its research and contributors. It deserves our hearty and active support —and it will merit our regular reading.

Jacob L. Devers

Commanding General,
Army Ground Forces.

THE AMERICAN INFA

by Major Gener hn
Commandant Inf

Signal Corps Photo

With smoke from blasted German armor filling the sky, American Doughboys follow their armor on the road to Fontainebleau just before the liberation of Paris.

WHEN the European war started in 1939 there is little doubt that the Germans had the most advanced picture of the capabilities of armored forces. The German General Guderian was the leader of world military thought on this subject, with the British General J. F. C. Fuller a close second.

The armies which followed the Guderian teachings did so blindly and rigidly. This blind faith was undoubtedly increased by the astonishing initial successes of his theories.

The German habit of doing things by rote and lack of flexibility worked heavily to their detriment as allied countermeasures came closer to providing an effective answer to the German tank theory. Over long periods the losses the Germans suffered continued to be almost net losses—so many tanks, so many men, so much tactical or strategic advantage.

Our army, on the other hand, from Tunisia to Okinawa, took its losses thinkingly. Against those losses they usually could make a credit entry—"This thing we have learned; next time we will do this." And the losses saved by this open-mindedness and mental flexibility may well have overbalanced those we suffered in learning lessons.

Infantry and armor finished the war with an ability to coöperate which was almost unbelievable to those who had opportunity to see how deficient they were in this respect in the early stages of the war.

That deficiency, which characterized the non-armored infantry divisions and the independent armored battalions, was due primarily to a lack of material for proper combined training of the two arms. It did exist, however, and caused us losses. Tunisia for instance, still furnishes sad and bitter memories to many.

It is a primary responsibility of those charged with the training of these two closely related and highly interdependent arms, that this same defect does not exist should we be faced with a future war.

Amazing Mental Flexibility

In studying the factors affecting future training at The Infantry School a most encouraging one stands out prominently in the experience reports available. That factor is the amazing mental flexibility of the American soldier and the speed and relative ease with which he was able to abandon any preconceived ideas he might have had and adopt new ones to fit the situation at hand.

He fought each battle as he came to it. When the methods he had been taught failed to work he experimented. When his experiments were successful he adopted them as tentative SOP. He unhesitatingly discarded those experiments which didn't work, and just as unhesitatingly modified those which would work when new conditions made them of doubtful value.

When an army of seven million men is built around a nucleus of less than 200,000, it is obvious that the small unit leadership is going to be in the hands of those who are not highly educated from a military point of view and who have few, if any, fixed ideas.

These men depended upon fundamentals, faced the issue as it existed, and made their decisions on the basis of cold fact, leavened with imagination and their compelling desire to save the lives of those who trusted and followed them. This freshness of viewpoint was tempered and kept within the bounds of military soundness by experienced supervision.

When our armor began to see action in North Africa in late 1942 and early 1943, there were widely divergent opinions regarding its capabilities and the proper methods of using it. The German successes in Europe and North Africa had led many to feel that the tank had become king of the battlefield, and the Doughboy was relegated to semi-service duties of cleaning up and

NTRY-ARMOR TEAM

erohn W. O'Daniel
date Infantry School

holding. We had developed the tank destroyer to combat the hostile giant of the battlefield and, in our enthusiasm, had even tentatively conceived for it the mission of running down enemy tanks and destroying them.

Armor Not Sufficient In Itself

We paid heavily in lives and in material to learn that armor, like every other arm, is not sufficient unto itself but must work with other arms not only for its own security but to achieve maximum results from combat.

Beginning in North Africa and continuing through Sicily, Italy, Europe, and the islands of the Pacific, we began to appreciate some of the problems presented by the ever-increasing closeness of the wedding of infantry and armor, and we began to solve those problems on the spur of the moment—and, more often than not, to solve them successfully.

None of those problems is yet completely solved. However, real progress has been made on many of them, and on others sufficient progress has been made to know that the problem exists, which is always a step forward.

Some of the solutions of the various problems which were adopted in combat are given below in quotations from or paraphrases of reports received from the various theaters. Though one unit is usually cited as the authority in each case, the same method frequently was employed by many other units.

The basic problem was the need for mutual understanding and confidence of infantry and armor, which are the real comrades of the battlefield. They must meet the enemy face to face and work together to destroy him.

In Africa, Sicily, and for some time in Italy and Europe, came recurring complaints from the infantry that the tanks had "failed to show up," had "pulled out when the going got tough." At the same time, tankers were making similar complaints about the Doughboy—"They wait for us to win the fight and then they walk up" . . . "They don't take out the antitank guns because the AT guns do not shoot at infantry." Various steps were taken to eliminate these misunderstandings. In Europe it became SOP to attach a tank battalion and a tank destroyer battalion to each division, and the same subordinate units of these attached armored units were ordinarily allotted to the same regiment so that they became acquainted and the mutual confidence grew by leaps and bounds. A number of units—the 175th Infantry was one—gave as many of its infantry as possible a ride in a buttoned-up tank. This not only familiarized the Doughboy with the difficulties of the tanker but gave him a much better realization of the limited vision and field of fire, and tended to reduce his fear of hostile armor. The same methods were used by the 307th Infantry in the Pacific Theater.

Errors—and SOP

Various expedients were adopted to reduce the need for withdrawal of tanks for refueling and resupply. In the hedgerow fighting in Normandy many tank battalions, including the 741st, adopted the practice of using tanks in double teams of two tanks each. The two leading tanks would furnish the infantry support until fuel or ammunition needed replenishing. When these withdrew they would be immediately replaced by the two tanks in rear. This system was kept up in many units throughout the European campaign. It was SOP for town and village fighting with the 736th Tank Battalion as well as with many others. In the Pacific, similar steps were taken.

In the 149th Infantry in the Pacific it was SOP for the infantry company commander and the tank platoon leader to make their initial reconnaissance together and to stay together during the operation.

One of the early errors that led to misunderstanding was commented on in a report from the 7th Armored Group in Europe during late September 1944. The comment told of the failure of infantry commanders to include in their staff conferences and in planning, the commanders of the attached tank units. The result, according to the report, was the assignment of unsuitable tasks to the tanks, and the loss of mutual confidence. It is significant that the last such report noted from the European Theater was made in mid-October 1944 by the XX Corps.

The infantryman's feeling of responsibility for protection of his accompanying armor increased by leaps and bounds. This was probably due to the somewhat selfish knowledge that if he lost one of his tanks he lost a powerful battlefield aid. Whatever the cause, this protection was SOP in all theaters within a short time after the first joint fighting of the two arms. The 1st Marine Division worked out an SOP during the Okinawa campaign. This provided that, when working in rubble or high vegetation, three or four infantrymen would accompany each tank and furnish protection from all sides against suicide attacks or close range antitank weapons; in relatively open country the infantry would furnish the same type of protection by following the tank closely enough to insure visibility—seldom more distant than 300 yards; in

canyons and valleys, specific infantry units were designated to take positions along the sides or crest to secure the advance of the tanks.

The extent to which the various expedients adopted to increase mutual confidence succeeded was well exemplified by a statement made by an officer of the 3d Infantry Division toward the close of the campaign. He was asked his opinion of the relative merits of the various tank battalions then doing duty in the Sixth Corps, to which the division belonged. He listed a number of the battalions in the order of his opinion of their efficiency. His questioner then remarked:

"Funny you didn't include the 756th" (the battalion which had been attached to the 3d Division for some time).

"Oh!" he replied hastily. "That's a part of the division. They don't come any better than that."

Communications A Major Problem

A second major problem, closely related to that of mutual confidence, was that of communications. Within a few days of the landing in Normandy it was general practice to fasten to the outside of a tank a telephone hooked into the tank's intercommunication system. This practice in various forms was continued until the end of the campaign and was also used in the Pacific. Other communication expedients adopted were: the 116th Infantry furnished the tanks with SCR 300 radios which were kept tuned in to the infantry battalion channel; the 761st Tank Battalion sent a liaison officer in a half-track equipped with an SCR 508 radio to infantry regimental headquarters; in the 16th Infantry when the tanks were moving ahead of the infantry, one tank was held back to permit the infantry commander to communicate with the tanks and when the two were together, the infantry company commander would ride in the tank with the tank platoon leader; units of the 6th Army in the Pacific used sound powered telephones in their tanks with about 50 feet of wire run out through the turret ventilator or the pistol port; the 330th Infantry installed SCR 536 radios in the tanks, removing a bolt and running the antenna, previously insulated, through the hole thus made.

Some of the most astonishing variations were observed in the proportions of the two arms allotted for the accomplishment of various missions.

During the early fighting in the Siegfried Line, the Third Armored Group, composed of the 741st and 747th Tank Battalions, was attached to the 28th Infantry Division to constitute a task force with the mission of widening the gap in the German defenses. Initially, German resistance was disorganized and spotty, and considerable success was obtained with a force in which the tanks predominated, with just enough infantry to occupy strategic pillboxes and hold the ground gained. After two or three days the enemy increased his mine defenses and brought in large numbers of panzerfausts and other antitank weapons. The force began to suffer tank losses. The tank and infantry commanders immediately got together, changed their organization and relative strength, and resumed their advance successfully.

The allotment of tanks to infantry varied from as much as battalion for battalion in some stiff fighting in Europe to the allotment of single tanks to infantry companies in the Pacific.

The tankers did not hesitate to abandon their theories of mass use of tanks where the situation required. This was particularly noticeable during the hedgerow fighting in Europe. There, more than a platoon of tanks seldom worked as a unit, and frequently two tanks would be attached to or would support an infantry platoon.

We have seen at what cost the lesson was learned that tanks must be employed with infantry support. But even that costly lesson was calmly tossed overboard by the 67th Armored Regiment shortly before the crossing of the Rhine. Several unsuccessful attacks had been made upon a hostile position which could be reached only across 3,000 yards of open ground. It was finally decided to make an old-fashioned cavalry charge. Two medium tank companies, one light tank company, and an armored infantry company were employed. Supported by artillery, the light tank company moved out first, at about 35 miles per hour. The mediums followed at a slower rate and the armored infantry, on foot, followed these. The position was captured with negligible loss of lives and tanks.

Obviously, there were dangers. There might have been tank traps or mine fields. Reconnaissance to locate them was made. The commander decided it was time to take a chance and employ mass. He was successful.

Battlefield Stories

Here is a story from the commander of Combat Command A, Fourth Armored Division: "To capture a bridge we approach it indirectly over secondary roads. The artillery places time fire on the bridge in order to prevent its destruction by the enemy. We move in fast under this time fire with our tanks followed by the infantry in half-tracks. One company of infantry is given the mission of seizing the bridge. The artillery forward observer moves with it. The engineers follow to search for wires and demolition charges. The infantry advances very close behind the time fire. We have had a few wounded by our own fire, but we feel the losses would have been greater with a different procedure and that this method is sound."

Tactical ideas and suggestions flowed in from both infantry and tank commanders throughout the European campaign where the number of tanks was far greater than in any other theater.

The 116th Infantry worked with tanks almost throughout the campaign and contributed a number of ideas. Here is a quotation from a member of that unit, made while the fighting was still at its height:

"Where practicable, we have the infantry and tanks attack from different directions. If we can't, we usually let the infantry follow the tanks at from 100 to 150 yards. The tanks are deployed in depth and all are firing; if the infantry were mixed in with them, they would be in danger from our own fire. As the tanks close on the objective they cease firing and the infantry passes through. Thereafter, the tanks fire only on call or on close and unmistakable targets."

This is from the same regiment during the pursuit phase: "When we make a breakthrough, the leading infantry company is loaded onto the tanks, except for one squad which is put on the vehicles of a platoon of the division reconnaissance troop. The reconnaissance platoon then reconnoiters to the front, closely followed by the tanks with infantry riders."

There was considerable discussion and experimentation in connection with the method of movement of infantry accompanied by tanks.

One of the most novel methods tried was based upon an infantry carrier called "Battle Sled," which was developed by the 3d Infantry Division at Anzio, Italy. Each sled carried one man. Twelve sleds were arranged in two columns of six each and were towed by a tank. The sleds were of armor plate and their use permitted keeping the infantrymen close behind the tank, with a measure of protection from enemy machine-gun fire and ready for instant action.

The commander of the 22d Infantry, 4th Division, was completely sold on the idea of riding his Doughboys on tanks and cited these as some of its advantages:

The infantry is above hostile machine-gun fire, and it offers a more fleeting target and gets some protection from the tank turret; the infantrymen are in good position to toss grenades into foxholes, to protect the tanks from bazooka and AT grenade fire, and to provide better observation for the tank crews; it crosses up the Germans, who teach their men to shoot the infantry following the tanks; when antitank guns are encountered, the infantry can dismount, deploy and knock them out. He cited among the problems involved, the partial disruption of command and staff organization, and the loss of the fire of infantry supporting weapons which could not well be similarly transported.

The 51st Armored Infantry frequently put its Doughboys on tanks but left them off the two lead tanks to reduce losses. They used this method particularly when the action was fast, and when moving through towns against spotty opposition.

Some armored infantry units used their half-tracks to transport infantry only when no opposition was expected. The 35th Tank Battalion, however, when in action with infantry, preferred to have its infantry in half-tracks because of the additional armor protection, which reduced the likelihood of losses from our own time fire. The 110th Infantry, which preferred a similar system, also pointed out that it kept the infantry squads intact and provided some additional safety because the half-tracks could be maneuvered to take advantage of the tank as a cover from small-arms fire.

Our soldiers refused to accept as gospel the dictum that tanks are helpless at night. The 357th Infantry in Europe used to have tanks follow a night attack primarily for the purpose of meeting the anticipated daylight counterattack, but secondarily for their powerful morale effect.

The 3d Infantry Division reported the use of searchlights for illumination of night operations. One platoon of searchlights provided enough light for night operations of an infantry regiment supported by armor. This system was used extensively by the division in the fighting in the Colmar pocket near Neuf Brisac in January 1945.

In the Pacific, the 775th Tank Battalion, harassed by infiltration of the perimeter by night, equipped some of its tanks with spotlights which could be aimed and operated by hand, and spotted them along the outer perimeter. When a noise was heard, the near-by infantry was alerted and the spotlight flashed in the direction. Time after time the Japs were "caught flat-footed and shot before they knew what was happening."

One of the pet aversions of the tanker—wooded country—was the subject of report after report. Our tankers just wouldn't accept any theory that they were useless in any situation.

Here are some experiences on tank operations in woods:

"We have our light tanks follow the infantry to each phase line," said an officer of the 774th Tank Battalion, "one tank section to each infantry assault company. Mine removers follow just behind the infantry and clear paths for the tanks. The infantry checks all clearings for antitank gun positions. When the infantry is stopped, the tanks come forward and spray the opposition until it is reduced."

The Fourth Division, after considerable experience, arrived at the conclusion that the light tank was better for close support in woods than the medium. The 314th Infantry, however, used its mediums to good effect in woods, particularly where hostile tanks were a part of the defense. These hostile tanks would usually be dug-in and practically immune to our tank destroyer fire. This problem was solved by blinding the hostile tanks with smoke from 81mm mortars. This necessitated movement by the hostile tanks to a position from which they could see—but from which they were now vulnerable to our tanks and tank destroyers.

Another subject of frequent report from units in the European Theater was joint tactics of infantry and armor in town and village fighting. Here are some highlights, the source being indicated after each.

"Our practice is to let the infantry enter the town while the tanks move to the flanks and rear to destroy the enemy as we flush him out. When the town is captured, the tanks move immediately to the outskirts to provide protection until the tank destroyers come up."

—116th Infantry.

"For each infantry platoon, we provide two tanks in support and two in reserve when moving through a town. The leading tanks are relieved by the reserve tanks when about half of their ammunition is exhausted. They take position in reserve and refill when the opportunity offers. In this way, continuous support is provided and all tanks are available for an emergency when any emergency is likely."—736th Tank Battalion.

"We assign one tank to fire on the lower floors and one on the upper stories. They fire on prearranged signals from the infantry."—377th Infantry.

"Where streets are wide enough, we have two tanks move abreast, each firing on the opposite side of the street. With this method, the tanks do not have a blind side as when they operate singly."—48th Tank Battalion.

"Our tanks start firing at the lower floor and work up. This either forces the enemy into the basement where the infantry can trap him, or drives him progressively up until our fire catches him."—750th Tank Battalion.

"When it is necessary for our tanks to work one to a street, we assign four infantrymen to protect each tank against short range antitank fire."—26th Infantry.

In the Pacific there were repeated instances of taking tanks where they "couldn't go" with astonishing results. Here is a quotation from the commanding officer of the 13th Armored Group on Luzon:

"In difficult country it took tremendous effort to get tanks up the steep slopes to the Japanese defensive positions. But the effort was well worth while. Often even one tank was of powerful assistance, partly because of the surprise. We also found that usually the Japs had prepared no antitank defenses in such locations."

By the close of the European campaign many units had adopted a fairly complete SOP for joint operations of infantry and armor. There are some noteworthy features in this extract from a report by the 612th TD Battalion.

"Before bringing forward the tank destroyers, the infantry would clear the mines on the route, prepare defensive positions, usually using shell or bomb craters as the start, compute ranges and provide guides. Our movement into position was screened by smoke. When the tank destroyers opened fire, the infantry mortars also opened with high explosive for the double purpose of confusing the enemy and keeping him down. When our mission was accomplished, our withdrawal also was screened by smoke."

Innumerable expedients were adopted. Most of them were made on the spur of the moment and many of them showed considerable ingenuity.

A number of units obtained forward observation for artillery fire from officers and noncommissioned officers of front-line tank units. The 229th Field Artillery Battalion made it a practice to place an artillery observer in one forward tank of each of the tank supporting elements.

Tanks were frequently used to bring forward supplies to the infantry where conditions made it impracticable to bring them forward by wheeled transportation.

In the 66th Armored Regiment a number of tanks were equipped with racks on the rear, permitting the evacuation of three wounded on each tank.

Beginning with the first joint operations in Normandy and continuing throughout the campaign, emergency supplies for the infantry were carried on the outside of the tanks fighting with them. This made the supplies readily available in combat, and tended to promote the feeling of comradeship and mutual confidence which grew amazingly during the campaign.

It will be noted that, in the examples given, solutions of the same problem were frequently widely divergent and, at times, almost diametrically opposed. At times they were in violation of what was our teaching. These are presented not with any idea of indorsing them as future doctrine, but rather with the idea of exemplifying the ingenuity and mental freedom of the American.

We, who bear the responsibility for the training of our basic fighting team of the future—infantry, armor, artillery and air—must do certain things.

Our training must keep abreast of new ideas.

We must study those ideas from every angle and try them in every way until we know what the effect will be—how best we can exploit their use.

We must foster and encourage in every possible way the spirit of comradeship and mutual confidence between these arms. To this end peacetime dispositions and training plans should insure that infantry tanks and armored reconnaissance units (and of course the always indispensable artillery) train together.

It is not the job of the infantryman or the tanker to worry yet about the effect of the atomic bomb on any future warfare, or about any of the other things that are hailed as presaging a revolution in combat methods. We must, rather, take our stand on the firm foundation that the infantry-tank team, reinforced by the powerful assistance of air and artillery, is the most potent fighting combination that ground combat has yet known.

Our job is to increase the power of this combination to the limit.

Above all, we must encourage and develop that quality in the American soldier which is a part of and peculiar to our way of life, the independent and challenging spirit which accepts nothing as final but always poses the question "Is there a better way to do it?"

Signal Equipment and the Armored Forces

by Major General H. C. Ingles
Chief Signal Officer

THE use of radio equipment in armored vehicles during World War I was not extensive compared with modern standards. Radio and automotive armored vehicles were relatively new and there was no working background to form a basis for their coördinated use.

As a rule, small field radio sets were mounted in the vehicles and operated on frequencies which embraced the present commercial broadcast band, and a few hundred kilocycles above it. These frequencies were strongly affected by man-made interference and by atmospheric electricity.

Comparatively little was known about antenna requirements in those days, and the range of vehicular radio was curtailed since the short antennas used could not function efficiently on the relatively long wave lengths (medium frequencies) then in use.

It was almost a decade after the war before appreciable progress was made in designing radio equipment for use in armored vehicles, rather than merely adapting existing equipment to such use. Within two more years, a tank set had been developed and tested in the 3,000 to 4,800 kilocycle band. Reception was good on CW, ICW and voice over a range of three-quarters of a mile.

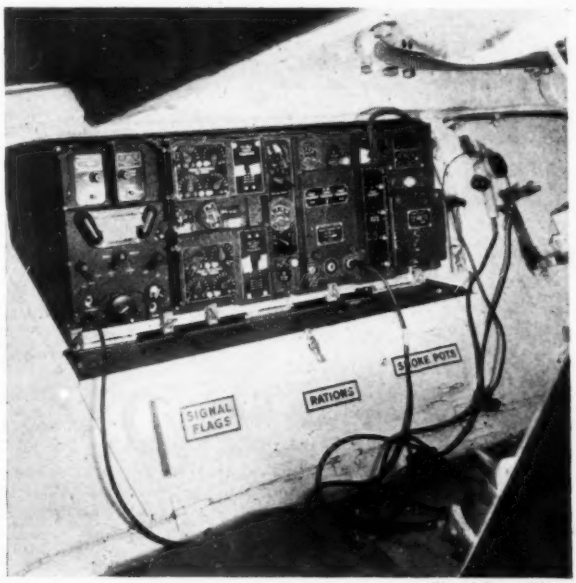
Shortly after this country's entry into World War II, this range had been increased more than 3,000 per cent.

Supplying communications equipment for armored force vehicles presented a number of problems not encountered, or met only to a lesser degree, in designing other signal corps apparatus.

Space was restricted and the equipment had to be compact. The vehicles were highly mobile; it therefore was necessary that the equipment be capable of functioning whether or not the vehicle was in motion as well as affording communication range over appreciable distances. The vehicles traveled over rough terrain—some were amphibious; the equipment had to be engineered to withstand violent road shock, and shock mountings were needed. The vehicles were used in all theaters and the communications equipment had to perform in the zero temperatures of the sub-arctic and in the heat and humidity of the tropics. Vehicles were made in a wide variety of types, necessitating various means of mounting radio sets and their components.

In addition, antennas were required to fit the conformation of the vehicles and to match the input and output impedances of the receivers and transmitters. As armored vehicles are sources of both electrical and mechanical noise, it was necessary to devise means of avoiding or minimizing the effects of electrical noise through the use of suppression systems and set design, and new microphones and headsets were developed to overcome difficulties caused by mechanical noise.

The radio set SCR-506 as installed in the right hull bulge in the light armored car, M8. This photograph was taken from the driver's position.



Signal Corps Photo

The first development work on a radio set designed especially for use in armored vehicles was the conversion of the transmitter of a radio set formerly used in day bombers (the SCR-134) to vehicular installation. For use in tanks, this transmitter was combined with the receiver from a cavalry pack set, the SCR-163. The latter provided 10-mile phone and 30-mile CW range. These equipments gradually evolved into the Radio Set SCR-193 which was in use during the early months of World War II.

As early as 1930, tests were made with equipment which incorporated an interphone to permit communications between members of the tank crew under the conditions of high mechanical noise encountered within tanks. An "antinoise" microphone—the early forerunner of the noise-cancelling lip microphone T-45—was found to afford much better communication than standard radio-telephone microphones.

Antennas had posed a problem from the very first. It was necessary to establish a compromise between mechanical strength and suitable electrical characteristics. Many types were considered: a condenser (capacity) type consisting of a metal plate supported several inches from the tank hull, a piece of heavy pipe bolted to the top and rear of the tank, a trailing antenna, and a loop antenna mounted on the tail of the tank. However, despite the likelihood of damage from overhanging branches, enemy fire and other hazards, the conventional fish-pole antenna was soon found to be the most practical. It was developed in 1930 and, with many improvements, has remained in use ever since.

Tests were conducted in 1931, using the then standard ground set, SCR-136, the two-pack set, SCR-163, and a newer set—SCR-189—which had been developed especially for tank use. In addition there was a receiver for installation in tanks which might be "dumb" but not "deaf," the SCR-190. Each of these sets was powered, at least in part, by batteries external to the electrical system of the vehicle.

Later developments were Radio Sets SCR-209 (a transmitter and receiver) and SCR-210 (receiver only). These formed the groundwork for the development in 1936, of Radio Set SCR-245, one of the best-liked armored force sets in the early years of the war.

In these early days, armor was known as mechanized cavalry. As it assumed greater importance, becoming the armored forces, the necessity of providing improved radio equipment became manifest. In 1940, a program for the provision of special sets was undertaken to meet military characteristics supplied by the Armored Force Board. These characteristics resulted finally in the production of Radio Sets SCR-506, SCR-508, SCR-509, SCR-510, SCR-528, SCR-538, and such accessory equipments as Interphone Equipment RC-99 and Interphone Extension Kit RC-298.

Radio Set SCR-506 is used for communication in command and administrative radio nets. It uses amplitude modulation, the transmitter providing 126 channels from 2.0 to 4.5 mc, and the receiver covering 2.0 to 6.0 mc. It was available for use with either a 12-volt or 24-volt power supply, and was designed for installation in various tanks, armored cars, half-tracks and other vehicles, either alone or in combination with other vehicular sets.

Radio sets SCR-508, SCR-528 and SCR-538 are similarly designed for operation on 12 or 24 volts, and for a wide range of installations in armored or other vehicles. The SCR-508 includes two Radio Receivers BC-603, and one Radio Transmitter BC-604 (which incorporates an interphone amplifier). SCR-528 is the same, except that only one radio receiver is included. SCR-539 has one receiver and no transmitter, the interphone requirements being provided by Interphone Amplifier BC-605. These sets, providing 80-channels in the 20.0 to 27.9 mc band, are of the frequency modulated type, affording voice communication over a 10-mile radius when moving or a 15-mile radius when stationary, even in areas where the electrical noise level is high.

Radio Sets SCR-509 and SCR-510 are also frequency modulated equipments; the former is a portable set powered by dry cell batteries, the latter a similar vehicular set operating from a 6-, 12-, or 24-volt dc source. Each transmits on two pre-set channels in the same band as the SCR-508/528/538 series, affording a five-mile range with voice communication.

As none of these sets netted with infantry equipment, two other radio sets were employed to facilitate tank-infantry cooperation. Upon occasion, Radio Set SCR-536 (the "handie-talkie") was taken into the tank, for communication between the armor and the infantry which supported, or was supported by it. The SCR-300 (the "walkie-talkie") was similarly used, and formed the basis for a new equipment: Radio Set AN/VRC-3. This set included the Transmitter-Receiver BC-1000 of the SCR-300, with a special antenna, tower supply, and other accessories to suit it to vehicular use. Like the SCR-300, the AN/VRC-3 was frequency modulated, with a range of three miles on voice in the 40.0 to 48.0 mc band.

To permit conversation between the members of the crews of tanks and other armored vehicles, Interphone Equipment RC-99 was provided. This was employed in conjunction with radio sets that did not include interphone, and in vehicles not radio-equipped.

Interphone Extension Kit RC-298 was used to afford telephonic communication from persons outside the tank to those inside. It consisted essentially of a handset mounted in a metal box on the tail of the tank and connected to the interphone system of the tank. When the tank was halted, or moving slowly, persons external to the tank were able to take the handset and talk to the crew. When tanks were emplaced, a remote field Telephone EE-8 could be connected to terminals provided in the external box.

Although the frequency modulated radio equipment

designed for the armored forces was relatively free from the electrical interference created by the vehicles, further measures were taken to minimize this noise as much as possible. Not only were the sets carefully shielded, but the ignition systems of the vehicles were shielded and (or) suppressed. It was found that wheel and track static might be minimized by the employment of conductive rubber for tank treads and the like. These measures, together with bonding to keep all portions of the vehicle at the same potential, kept such interference at a minimum.

Mechanical noise was overcome by means of specially designed microphones and headsets. Microphone T-45 incorporated a diaphragm, both faces of which were exposed to ambient noise, striking both faces simultaneously, little or no diaphragm motion was caused by the noise sound waves. As the microphone was suspended on the upper lip of the user, his voice struck one face with far more force than the other, thus providing a signal.

Mechanical noise was prevented from interfering excessively with reception through the use of Headset H-16/U. This consisted of a pair of large ear cups, made of soft rubber where they contacted the wearer's head, and of steel on the outside to afford protection. In the base of each cup was a matching transformer and a phone unit of the hearing aid type, the output of which was fed to the user's ear through a metal tube and a soft rubber ear insert. The double seal (insert to ear orifice, and cup to head) cut out a large percentage of the ambient mechanical noise.

In addition to radio communication equipment, the armored forces were provided with cloth panels for use in identifying themselves to friendly aircraft in the daytime, and high intensity signal lamps for a similar function at night.

The armored forces' use of signal equipment was by no means limited to the items especially designed for them, for higher echelons employed all the wire, high power radio, radio relay, teletype and similar systems which were used by similar commands. The extent to which such equipment served can be judged from the records of the 146th Armored Signal Company, which served with the 6th Armored Division from Normandy through Brest and the Battle of the Bulge, all the way to the Mittweida, in Germany.

During the period from July 18, 1944, to May 8, 1945, the message center of this company handled 152,340 messages, of which about one-fourth were forward and three-fourths to the rear. It is estimated that 14 ¼-ton vehicles traveled a total of 208,544 miles to accomplish this.

Some 1,385 miles of telephone wire were laid during this period, and 3,508 teletype messages were handled. Six CW radio nets operated with net control stations located at division headquarters, including one station always in the Corps' Command net. From July 27, 1944, to May 8, 1945, these stations transmitted a total of 3,414 messages, representing 117,594 groups. It has been estimated that approximately six times as many messages were received as were transmitted. These figures do not include some 20 other CW radio nets operating within the units of the division.

The signal corps equipment supplied to this single armored signal company during the July 18, 1944-May 8, 1945, period included:

Antennas	292	Radio Set SCR-300	26
Batteries	88,894	SCR-506	18
Converter M-209	82	SCR-508	56
Cords	2,413	SCR-509	4
Crystals, sets	150	SCR-510	220
Dynamotors	84	SCR-511	21
Flashlights	2,789	SCR-528	51
Fuses	490	SCR-536	137
Handsets	260	SCR-538	10
Headsets	906	SCR-593	10
Mast bases	467	SCR-608	7
Mast Sections	4,944	SCR-610	13
Microphones	1,182	SCR-694	19
Mountings	75	Radio Receivers	100
Panel Sets	6,045	Transmitters	105
Telephone EE-8	577	Tubes	17,631
Wire, miles	6,162	Detector Set SCR-625	———

The above figures do not include radio sets drawn through ordnance channels with replacement vehicles, nor the individual items on the parts lists of complete radio sets.

The performance of the equipment supplied to the armored forces by the signal corps may best be appreciated by a study of the reports from using organizations. The following are typical:

"Armored force Sets SCR-508, 528, 538 and SCR-509 and 510 have become the backbone of communication within the armored division. The inherent advantages of FM (frequency modulation) in overcoming static and ignition interference and in giving a clear voice signal of sufficient quality and volume to be heard over the noise of tank operation, have fully justified the additional complications of design and manufacture. The flexibility of operation, combined with the accuracy of crystal control, have made this series of sets the easiest sets there are to operate."—Letter from Colonel Grant A. Williams to Office of the Chief Signal Officer, March 18, 1944.

"Lt. Col. Wyndham, Signal Officer, First British Armored Division, said of the SCR-508, 'I like it. It's better than anything we have. I like its compactness.' "

"The Facsimile Equipment RC-58 is one of the most valuable improvements received to date. We have 15 sets operating continuously, and no real difficulties have been encountered once the equipment was installed." —Lieutenant Colonel H. C. Williams (with 1st Armored Division), December 29, 1944.

Perhaps it would be well to conclude this article with an extract from the report of the 141st Armored Signal Company from June 18, 1940, to May 20, 1943:

"All radios were working excellently and communications were the finest to be had."

Combat Engineering--
Lingayen to Manila*

by

Lieutenant Colonel James B. Lampert

Corps of Engineers

THE XIV Corps of the Sixth U. S. Army landed on northwestern Luzon in the Philippines on January 9, 1945, then marched and fought its way 120 miles to enter Manila in 26 days, and had cleared the city of Japanese by March 3. As in every other operation of the war, Combat Engineers were there all the way.

The Sixth Army made its landing with the I and XIV Corps on Lingayen Gulf. Its mission was to seize a beachhead in the Lingayen–Damortis–San Fernando (La Union) areas, and subsequently seize the Central Plains–Manila area by overland operations. Each Corps consisted of two divisions and supporting troops. A fifth division was in reserve. Lt. Gen. O. W. Griswold's XIV Corps, composed of the 37th and 40th Infantry Divisions, landed on the beach between the towns of Lingayen and Binmaley.

Operation In Three Phases

I Corps, on the left, encountered stiff resistance, and was forced into a hard, slow advance into the mountains and hills to the east and north. XIV Corps landed almost unopposed, and exploited its landing with vigor. The result was an operation in three phases:

a. A speedy, relatively easy, advance over open terrain to the Fort Stotsenburg Area, where stiff resistance in the hills on the west was cleaned out by the 40th Division only after bitter fighting lasting several weeks.

b. A sidestepping by the remainder of the Corps around Stotsenburg, and a resumption of the drive into the outskirts of Manila, over numerous streams where all bridges had been destroyed and against constantly increasing resistance. The newly arrived 1st Cavalry Division joined the Corps in this phase and formed the left of the two-pronged advance.

c. A month of bitter fighting through the streets and from house-to-house to clear Manila of last-ditch enemy resistance which caused high casualties among our troops. In this phase the Corps was reinforced by the 11th Airborne Division, under control of Eighth Army, which had landed near Nasugbu, south of Manila Bay and forced a rapid entrance into Manila from the south.

Combat engineer missions in the first two phases were almost exclusively stream crossings. The third phase brought the Corps into heavily mined and barricaded areas, and the engineer troops put much of their effort on these. Engineers of the 4th Special Brigade operated the corps beaches at Lingayen. Army engineers, including aviation battalions, often were near the front, both in support of the tactical mission and on high priority logistical projects requiring early completion. This article covers only operations of engineers under XIV Corps, omitting the fine record of these other units.

Plans for the Landing

Local planning for the Lingayen landings began in August of 1944. The Corps Engineer was a member of a planning party under the Chief of Staff, XIV Corps, which spent about a month at GHQ in Brisbane. Final planning was conducted and completed at the Corps G.P. at Bougainville, Solomon Islands. The 37th Division and the bulk of the corps troops were at Bougainville; the 40th Division was at Cape Gloucester, New Britain.

Extensive terrain studies, aerial photographs, and maps of the beach area were available to the Corps Engineer. Two considerations governed engineer planning:

a. The XIV Corps landing beach was backed by a delta area crisscrossed by streams, estuaries, fish ponds, and rice paddies. The most important stream was the Colmay River. In effect the initial landing area was an island, and several successive stream crossings had to be made to debouch from it into the higher terrain of the northern Central Plains. The only safe tactical assumption was that all bridges would be destroyed by the enemy. (See Figure 1.)

b. Only two main roads led south in the corps sector. Assignment of one road to each division as a main supply road was obviously the only solution for the planned advance toward Manila.

*The Military Engineer.

The restricted amount of usable land in the delta area, and the extensive plans for early landing of troops and supplies, as well as for immediate development by Army of the Lingayen Airfield, required that the tactical troops clear the area and seize terrain to the south, without delay, to give themselves "room to fight."

Based on these considerations, plans were adopted for division and corps engineers to land by means of assault shipping enough bridging material to open the two axial roads for required loads without dependence on material from other sources. By a compromise between the desired and the available, the final plans provided this bridging composed of prefabricated timber trestle, three units of Bailey bridge, and the M-3 material of the light ponton company. Sixth Army promised additional bridging on Army-controlled ships to follow immediately.

Less concern existed over the engineer problem south of the Colmay Delta. This stage of the campaign could develop along any of several different lines, and detailed planning had to await development. Supply of materials after the assault stage was an Army responsibility.

Intelligence data indicated few underwater and beach obstacles, and the landing plans assigned to the Navy the primary task of removing any which might be found. Engineer demolition parties were organized, and accompanied the advance waves to reinforce the naval parties, if required, but prelanding reconnaissance confirmed our information. No obstacles were encountered.

Engineer troops assigned to the Corps were the 1129th Combat Group, 131st Combat Battalion, 1279th Combat Battalion, and five separate companies: topographic, maintenance, light ponton, water supply, and camouflage. The group headquarters and two battalions had been with XIV Corps through the New Georgia and Bougainville operations. In a theater accustomed to a paucity of engineers, this troop list was almost utopian.

The engineers on Bougainville were relieved from operational duties just prior to departure for Luzon, but they managed to sandwich in some good training, obtained full replacements, and were in good order when the loading-out time came. One weakness was that none of these units, long overseas, had seen a Bailey bridge until late November. Later results showed up this weakness.

Engineer supply before the operation posed two main jobs: replacing old equipment and finding enough bridging. The equipment arrived, but every commander and supply officer aged ten years trying to get it. Bridging was provided by working every possible source. When bridge timber imports failed to materialize, engineer sawmills on Bougainville milled enough native timber for 1,500 lineal feet of 35-ton trestle bridge; this, late, was worth its weight in paper pesos. To complicate the supply picture, Bougainville having been part of the South Pacific Command, the troops coming from there drew their supplies from that command; the troops at Cape Gloucester drew on Southwest Pacific supply bases.

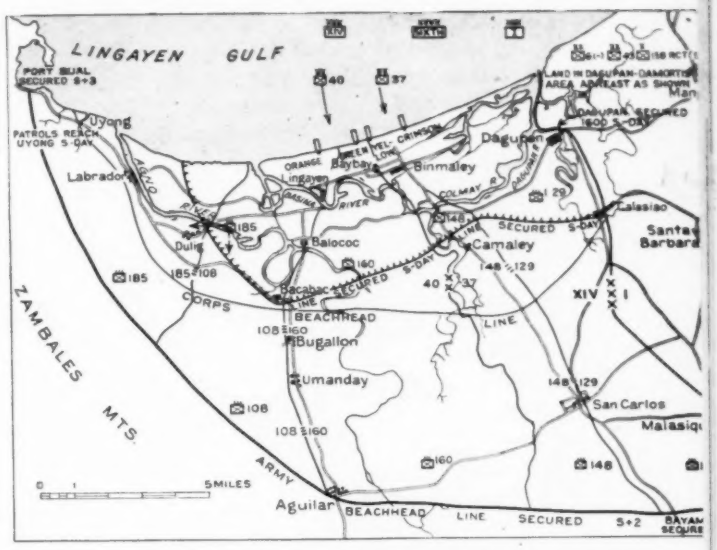


Figure 1. XIV Corps landing operations.

As in all amphibious operations, the provided ships lacked the capacity to carry all the matériel on hand. Engineer equipment was given preferential treatment to meet the anticipated problem of egress from the Colmay River delta at Lingayen, but equipment and supplies whose lack was sorely felt were dropped back to later shipping echelons. The 1279th Combat Battalion moved by administrative shipping from Bougainville to Cape Gloucester in November, and there was attached to the 40th Division for the voyage north. What could not be squeezed into the ships was left in rear echelons at Bougainville and Cape Gloucester, and shipped to Luzon during the succeeding five months. XIV Corps shipping left Bougainville and Cape Gloucester in December, rendezvoused off Huon Gulf, New Guinea, and moved north via Manus in the Admiralty Islands.

The Advance

Both divisions advanced rapidly after the assault waves reached the beach. In the 37th Division sector, the 117th Engineers of the Division came ashore attached to regimental combat teams and reverted to battalion control on S-Day plus 2. Using mobile-loaded bridge timbers, they bridged two small streams between the beach and the Colmay River. Infantry crossed the Colmay on S-Day in amphibious tractors and LCMs which came upstream from the sea. The highway bridge near Binmaley, a Howe-type steel truss, with one span dropped into the river, comprised the first obacle. The 117th Engineers laid a plank treadway to pass jeeps over the top chord members of the dropped span, and followed this with a 120-foot double-double

Bailey bridge. Heavy surf at the beaches delayed unloading, and construction of the bridge was slowed until enough Bailey parts came ashore and were hauled to the bridge site. The 131st Engineer Battalion, which had landed with the 37th Division beginning on S-Day completed the bridge.

Four miles farther south toward San Carlos, no additional floating or Bailey bridging having yet come ashore, the 117th Engineers constructed a 120-foot timber trestle bridge over a tidal stream with a soft bottom, in thirty hours. This bridge passed twenty-one medium tanks in two hours, plus the bulk of the traffic of division headquarters and one RCT, before the bents, as expected, began to settle unevenly. The 131st Engineers by this time had procured more Bailey material at the beach and launched a Bailey bridge over the trestle structure, which adequately carried all remaining loads.

Another RCT advanced south on the parallel road Dagupan–Malasiqui, supported by a company of the 117th Engineers. Several small streams were crossed by a variety of measures. Destroyed bridges were repaired by pioneer methods, one ferry was installed using pneumatic floats and bridge timber brought ashore by the division engineers on S-Day, and on occasions Filipinos built footbridges of bamboo, lashed together with grass.

The 40th Division, moving south and west from Lingayen, was faced at once by two large streams, the Basina and the Agno. Assault troops went over in LCMs, Amphtracs, assault boats, Filipino dugout canoes, and Infantry support rafts. Both streams were deep, tidal, and over 500 feet wide. Permanent bridges had been destroyed twice, by the retreating Americans in 1941 and again by the Japanese in 1945. Floating bridge equipage did not become available until S plus 4. At that time the 556th Heavy Ponton Battalion (a newly arrived Sixth Army unit) threw a steel treadway bridge over the Basina, and the 530th Light Ponton Company under the 1129th Group installed an M3 Light ponton bridge over the Agno. The road was opened to division loads on S plus 7.

The Group Commander had placed the 1279th Combat Battalion in support of the 40th Division. This unit landed on S plus 2 and thereafter worked in close liaison with the Division Engineer, Commanding Officer of the 115th Engineers.

South of the line Aguilar–San Carlos–Malasiqui, the terrain is rolling, relatively high, and cut by small streams. The divisions drove south on parallel roads to the Clark Field–Fort Stotsenburg area (see Figure 2), and engineer support followed a definite pattern. Division engineers built hasty by-passes around destroyed bridges by bulldozing earth fills across streams, using wooden culverts or short trestle bridge sections on the larger streams. The corps battalions followed closely behind, taking over each project from the division engineers as rapidly as possible, completing and

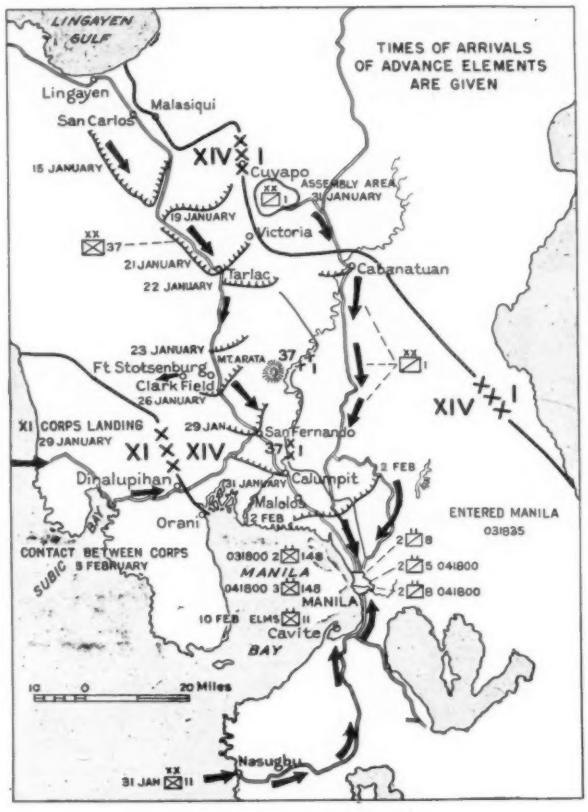


Figure 2. Routes of advance to Manila.

improving it for corps loads, and then, in turn, handing it over to Army engineer units in the rear. This system could have succeeded only in the dry seasons, when all watercourses were at lowest stages. Two crossings of the Agno in the 37th Division Sector were made by heavy ponton bridges constructed by the 556th Heavy Ponton Battalion.

In the Clark Field–Fort Stotsenburg area our troops encountered the enemy in force. The 40th Division swung to the east to clear the area and the surrounding Zambales foothills. The result was a tedious drive into a rugged, heavily fortified area where advance was measured by the number of cave defenses knocked out. The 115th Engineers found their load lightened with the slower advance. They were employed mainly on construction of temporary "jeep" supply roads into the foothills, and on removal of minefields. Meanwhile the Corps, now strengthened with the 1st Cavalry Division, pushed on to Manila.

Drive to Manila

The 1st Cavalry Division, attacking south from the Cabanatuan area along Highway 5, made its now-famous dash into Manila. By speed and by skillful use of sideroads and fords, its advance elements brushed aside scattered opposition and reached Manila without being delayed by destroyed bridges. The 8th Engineer

Squadron of the Division sent mobile-loaded bulldozers and bridge timber with the leading elements, and provided an adequate crossing or detour at every stream. The 131st Engineers, less one company, were placed in support of the division on January 29, and, to quote the battalion commander, "spent most of their time trying to keep up." The route was over good roads, and the seizure of a large number of bridges before the Japs could destroy them eased the engineer task.

The 37th Division, and the bulk of the corps troops moved on Manila via San Fernando, along Highway 3, designated the corps axial road. Here also a rapid advance brought about the capture intact of several bridges south of San Fernando. However, American strategic bombing in the preceding months had destroyed the bridges on three major streams near Calumpit, of widths ranging from 250 feet up to 600 feet. Assault troops crossed these streams in amphtracs, assault boats, and on light ponton rafts. Heavier traffic, including vitally needed artillery and tanks, was stalled.

This nut was the hardest to crack of any between Lingayen and Manila. New floating equipage on ships anchored off the Lingayen beaches was delayed in coming ashore by unloading priorities. The advance had left the engineer dumps far behind. Much of the equipage already on shore was installed over streams to the rear. The nut cracked by working on every possible solution. The Army, Corps and Division Engineers maintained almost continuous telephone connections among all their offices. At Lingayen, a cargo of treadway bridge was unloaded at once. The 556th Heavy Ponton Battalion (Sixth Army) bridged the 250-foot stream at Calumpit with a 25-ton ponton bridge and the 600-foot Pampanga River was spanned with a M2 steel treadway bridge. The 1279th Engineers replaced three demolished spans in the third bridge with 80-, 90- and 100-foot Bailey spans. The S-4 section of the 1129th Group pooled all available cargo trucks and ran a continuous motor-freight service, hauling bridge material 80 miles from the Lingayen beach dumps direct to the sites. Initially the treadway material was insufficient to bridge the Pampanga; the 530th Light Ponton Company finished the job with M3 light ponton equipage, successfully improvising a floating joint between the two types of bridge. Three combat companies from the 131st and 1279th Engineers reinforced the ponton units for the work. And no one in the division and corps engineers went to bed for 72 hours. The bridges were open on the third day.

Japs Destroy All Bridges

Meanwhile the 37th Division continued on to Manila. In the final 30 miles were six or seven streams, averaging 150 feet wide. Capitalizing on the delay near Calumpit, the Japanese had destroyed all of the bridges. From February 3-6, the 530th Light Ponton Company was in close support of the 37th Division. Its light equipage bridged or provided ferries across each stream. One critical day all the 105mm howitzers of the division successfully crossed two streams on infantry support bridges, whose rated capacity is only a 2½-ton truck. M3 light ponton equipment was used on two streams. As before, the corps combat battalions, supported by Army heavy ponton units, followed the advance elements. Bailey bridge, hauled by truck from the Lingayen area, was used wherever it was possible; steel treadway was thrown across two sites. By evening of February 7, all traffic was moving directly into northern Manila. In seven days, using material transported an average of 100 miles, a light ponton company, two heavy ponton companies, and the equivalent of five combat companies drawn from three battalions had constructed 2,100 feet of 35-ton floating and Bailey bridge.

During the month ending with the drive into Manila, perhaps 80 per cent of all combat engineer effort was spent on getting the divisions over streams. Other tasks, of course, were continuous. One Corps combat engineer company landed on S-Day, with three bulldozers, and helped construct positions for the antiaircraft artillery with the Corps. This attachment was terminated after four days, when our overwhelming air superiority and movement of the Corps south from the beach supply areas indicated the improbability thereafter of serious enemy air attacks.

Road maintenance by corps engineers was secondary. The rate of advance prevented anything but filling pot holes and hasty grading. Dry weather was on our side, and the comparatively good network of prewar highways carried all corps loads without any failures. What had been a major problem for engineers in the rains of the Leyte campaign was a comparatively routine task on Luzon.

Our drive met the first obstacles in the Clark Field area, mostly crudely placed fields of hastily buried aerial bombs, plus some improvised wooden box and "yardstick" mines. Engineers of both divisions and from the two corps combat battalions, materially assisted by ordnance bomb disposal teams, cleared these fields. Detection was easy because of poor concealment.

Engineers were not used as infantry but they habitually provided security for their own work parties.

The separate engineer companies with the Corps worked with distinction at their assigned jobs. The work of the light ponton company has been discussed. The 1520th Water Supply Company, two platoons landing S-Day, established water points in close support of the two divisions, and moved often to keep its supply sources well forward. The survey platoon of the 670th Topographic Company was attached to the Corps Artillery, which had no organic artillery survey elements. They continued this mission throughout the campaign. The balance of the company, landing on S-Day plus two, remained mobile until the advance passed Tarlac. It then established itself in that town and printed maps and map substitutes round-the-clock for XIV Corps and Sixth Army.

Capture of Manila

The flames of burning Manila lighted the sky every night of the week before we drove into the city. The awful destruction, the bitter Japanese stand in the most modern part of the city until the beautiful government buildings and the historic Intramuras were battered down on the last enemy, are familiar stories now. The engineer share in the capture of Manila was two-fold: crossing the Pasig River and clearing the heavily mined streets.

That half of Manila north of the Pasig was captured quickly. On February 6, the 37th and 1st Cavalry Divisions stood all along the northern bank. The 11th Airborne Division entering southern Manila after its rapidly exploited landing south of Manila Bay, passed to XIV Corps control on February 10. To cut off enemy escape to the east, and clear the city, the three divisions were ordered to converge on the main enemy force in the modern business and government district south of the Pasig.

The 148th Infantry (37th Division) crossed the Pasig on February 7 near the Presidential Palace, in 30 assault boats manned by the men of the 117th Engineers. Five waves were crossed, all but the first under intense enemy small-arms, mortar, and medium artillery fire. Infantry support rafts propelled by outboard motors, followed up and supplemented the assault boat crossing. The following day, the 530th Engineers moved their M3 equipage to the area, and, after several delays because of hostile fire, threw across a 350-foot bridge in seven hours, completing it at midnight. This bridge site was under fire for several days, but constant maintenance kept it open, and it supplied the 37th Division advance for three days. Army engineers, procuring equipage as fast as it came ashore at Lingayen, constructed an M3 steel treadway bridge with the assistance of the 1279th Engineers, which eased the traffic load.

Two miles upstream, on February 9, the 8th Engineers ferried assault waves of the 8th Cavalry across the Pasig against light opposition, and maintained ferries for two days until completion of a 260-foot M3 steel treadway bridge by the 556th Heavy Ponton Battalion, assisted by the 1279th Engineers.

In the final assault on the Intramuras (walled city) on February 23, one of the three simultaneous attacks was an assault crossing of the Pasig by the 129th Infantry (37th Division) in assault boats manned by the 117th and 530th Engineers. Thanks to the artillery preparation and the vigorous land attacks on two other sides of the Intramuras, this crossing was completed without opposition.

The enemy subjected the Pasig bridges to intermittent fire for two weeks. Several hits occurred, but repairs were always completed without serious delays. Japanese suicide demolition detachments twice approached bridges at night in small boats. Each time they were fired on by the bridge guards, their demolition cargoes detonated, and the parties were effectively destroyed.

Japs Use Expedient Mines

Minefields, infrequently encountered in outlying sections of Manila, were the major hazard in the Luneta-Intramuras Districts. For reasons not entirely clear, the Japanese continued to use only expedient mines—the most common being aerial bombs and marine anti-boat mines. Some were wired for electrical detonation from foxholes but, primarily because of our artillery preparations, no casualties resulted from deliberate detonation. Since most of these mines had been placed by digging holes in paved streets, detection was not difficult.

Minefield removal was largely the work of the 117th Engineers (37th Division) and the 127th Airborne Engineers (11th Airborne Division). The weight of the individual mines prevented removal by hand. The common system was unscrewing the fuze and then lifting the mine by a cable or improvised crane on a truck, tank or other vehicle. Much of this work was done under fire. The 37th Division Engineers removed several fields in streets near the City Hall under small-arms and mortar fire, by the successful use of a tank-infantry-engineer party. While infantry covered the area, the engineers moved out into the street in the shelter of the advancing tank, which fired its cannon at visible targets. Arriving at the mine, one engineer ran around the tank, disarmed the mine, attached a tow cable, and ran back to shelter. Then the tank, while continuing its fire, pulled the mine out of the ground and away from the area.

The 117th Engineer official report, in a prime understatement, says this system, while producing very low casualties, "was very nerve-racking on the mine-removal personnel."

Summary

Manila was cleared of the enemy on March 3. This article has touched only the high spots of the engineer story during these two months. Through it all, while the more spectacular tasks occupied the limelight, every engineer soldier drove himself without rest on the endless tasks which are always his. He supplied pure water to the liberated internees at Santo Tomas; he drove his bulldozer against the debris that blocked the streets of Manila; he built semi-permanent bridges replacing hasty by-passes; he probed captured areas for mines; he did all the jobs in the field manual, and others, too.

The Combat Engineer doctrine contained in our manuals and our school teachings is sound. The campaign proved that. It also proved, if it needed proof, that the American engineer soldier is tops—his technical ability, native ingenuity, endurance, and high personal courage make him a man with whom it is a privilege to serve.

Why Jap Air Force Died*

by Lieutenant Commander Philip Gustafson, USNR

IN a last-minute frenzy to find something that would stop our B-29s from destroying her industries and keep our fleets away from her shores, Japan was feverishly pushing the development of jet-propulsion aircraft when Hirohito ran up the white flag. Considering their late start, our air intelligence found, the Japs had made amazing progress. Yet, however well it was planned, this hastily built equipment proved to have too many bugs. Given time, the Japs would have eliminated them. But time ran out.

The Japanese aeronautical holy of holies was a straggling collection of thin-walled stucco buildings with flaking green-brown camouflage paint, flimsy hangars, and shabby aircraft parked every which way, some of them down on their knees from American strafing. On the surface, it wasn't much, but this was partly because there was so much beneath the surface: In the solid limestone of the Yokosuka hills were shops, hangars, storage and living quarters—a whole experimental aircraft factory underground.

Inside the shops, however, were dirt and disorganization. Hand benches. Hand tools. The hammering out of little pieces. Scattered disorder. Everyone had apparently worked in his own little messiness. There was no apparent clear flow of manpower effort.

"This was one of the very things that licked them," said Lieut. George Hall, USNR, grizzled, untiring, and tart of humor, who with Ensign Jimmy Wisely, USNR, went ashore with the Marines on August 30, the day MacArthur put his wheels down at Atsuki. His intelligence unit, which included representatives of the U. S. Navy, Army, and the RAF, was still living in front-line conditions when I arrived, cooking their own food, washing their own clothes, and flailing at fleas that abounded in the enemy's naval barracks.

"To my mind, the Japs were beaten before the first atomic bomb hit Hiroshima," Hall told me. "Their industrial system had been all but destroyed by our B-29's, their transportation system was breaking down, and all initial materials had been cut off by our subs and naval aircraft—stocks of aviation gas were so pitifully low that they couldn't even operate their current models. In semi-desperation they turned to rocket and jet-propelled development and committed all their remaining aircraft —between 8,000 and 10,000, they said—to Kamikaze attacks on our fleet. The Japs were a third-rate nation playing out of their league and the suicidal emotional drive they were trying to inject into their people would not make up for their own shortcomings in modern science and production."

This was the air force that four years before had challenged up to the heavyweight championship of the East and taken on the British on the side. And during the dark days of '42 its plagues of Zeros had come close to holding it. Then how did the mighty fall so low?

Admiral Hidao Tada, Chief of the Naval Experiment Station at Yokosuka, said one of the main reasons was the delay in replacing the Zero-type fighter.

"The high command was lulled into a sense of false security by the early successes of this plane, while your air force, with the sting of early defeat, began building on your Hellcat," he explained. "It was the Grumman Hellcat that beat Japan. When our high command did decide to put in mass production a plane to compete with your F6F, it was too late. We ran into design and production troubles. Then material shortages. In the end, we couldn't get the new fighters out in quantity."

Commander Yukio Otsuki, one of the chief designers; Vice Admiral Misao Wada, Chief of the Air Service Bureau, the Japanese counterpart of our Bureau of Aeronautics; and Vice Admiral Munetaka Sakamaki, one of the Navy's chiefs of air operations, told me the same story. Some of them blamed the delay on the General Staff and some on the fliers in the field, who clung to the idea of maneuverability. Admiral Wada said he had offered plane designs three years before with better armor, self-sealing tanks, and firepower but he had been turned down.

The story of the belated fighter development, as gathered from these different sources and from the confiscated aircraft themselves, is this:

Finally convinced of the inadequacy of the Zero, the General Staff ordered its designer, the great Horikoshi, to produce out an up-to-date fighter. Horikoshi went to work on the Reppu (Strong Wind) which turned out to be a gentle breeze. The trouble came when the Jap engineers, cut off from the countries they had always copied, had to turn to and bring out engines of their own. This same shortage of creative engineering talent, incidentally, showed up in other fields and proved to be one of the basic factors in Japan's undoing.

The Homare engine was the white hope to power the Reppu but it ran into bugs and more bugs. The electrical system was a nest for some. The lubrication system bred others. All of the headaches added up to a year and a half's delay and during this time the designers turned to the 18-cylinder Kinsei. This 18-month delay was fatal. Otherwise, said Admiral Wada, the picture might have been different, for the new plane was more maneuverable than the Hellcat, had good protection and heavier guns.

While Horikoshi was sweating out the Reppu, Ka-

**Popular Science.*

wanishi came forward with a proposal to make a land fighter out of the float plane, Rex. The offer accepted, this plane was developed into the George 11. It was a good plane except that its aerodynamic characteristics were bad and the modification problems presented more difficulties than the hard-pressed Japs had time to contend with. They settled on mass production of the George 21—1,000 a month—but they overestimated their manufacturers, considering the problems of dispersal and material shortage that were then arising. The Japs say that if they had had the George 21 six months sooner, they would have discarded their other planes even to the old faithful Betty, and concentrated on this fighter.

As it was, when we walked in on the Japs we found their Navy with two good first-line interceptors in production—the George 21 and the Jack 34. With another six months to work the bugs out of George's landing gear and Jack's supercharger, Jap engineers would have brought these planes to the point where they spelled trouble for us. But for any change in the outcome it would still have been necessary to get the fighters into mass production, train pilots, and provide good maintenance. They were a good two years too late.

When their reconnaissance and air-raid warning system broke down, the Japs were wild for something that could get up in the air fast enough to stop the Allied bombers which were making a shambles of the home islands. It was then that, in their desperation, they turned the heat on jet propulsion.

They had reached the test model stage in a B-29 interceptor called the Shusui, to be powered with a copy of the Walther used in the ME-163, the first German rocket plane.

In another development, a jet coupled with an internal combustion engine was used in a new suicide plane, the Baka 22. A four-cylinder Hatsukaze, inverted in-line, air-cooled engine drove a single-stage compressor to provide the power for these specially built Kamikaze planes, of which the Japs had close to 100 assemblies in construction.

Probably their most outstanding achievement had been in the development of an axial-flow, turbo-jet engine with which they planned to power a conventional-structure interceptor called the Kikka. The first test model of the Kikka had gone in the drink in August when the pilot pulled the throttle on takeoff instead of pouring on full power. The Japs were also planning to use this engine in a new suicider designated as the Baka 43, which had reached the mock-up stage.

Besides pushing jet propulsion in their frantic, last-minute defense effort the Japs were also converting bombers into night fighters and interceptors. They were modifying all possible planes to carry inclined fixed guns which were to shoot from the most favorable position, beneath and slightly to the rear of the intended victim. Every device the designers could dream up was being used to make up for the mistakes which had put the Japs so far behind us in fighter types that virtually their whole naval fleet had been lost.

One of these mistakes was the failure to set up a good pilot-training and rotation system along the lines of our own. Japanese flying admirals, asked to explain the failure of fighter squadrons to use teamwork tactics, always gave the same answer: "bad interplane communications," and "not enough good pilots." The Japs, after they lost most of their best fliers in the battles of Midway, Coral Sea, and the eastern Solomons, never did catch up. After each battle they used to have to pull back their first-run fliers for a sort of general retraining program.

Wartime aviation in Japan worked under a continuous handicap: lack of cooperation between the Army and the Navy. The two branches fought like cats and dogs. All development, purchasing, and production were carried on independently until the latter stages of the war. This resulted in duplication of equipment which a small country like Japan could ill afford when she was trying to crack the big leagues.

Poor organization also carried over into the individual services themselves. Both Army and Navy were tightly compartmented organizations where one home command knew little of what went on in the next region, much less in the field of operations. One reason was the almost pathological caution of the General Staff in matters of security, probably made necessary by its policy of keeping the facts of life from the people. But in the Jap Navy, this policy boomeranged. Officers of the rank of captain and below usually didn't get the battle news! Obviously the results were inefficiency and failure.

"I didn't know what happened in what you call the Marianas Turkey Shoot," Commander Otsuki told me. "How was I to design airplanes?"

This compartmentation policy was a direct cause of one of the gravest errors that the Japs made, the introduction of too many plane types, with which they overloaded their factories. Both Army and Navy had a way of adding new types to the point of utter confusion. One count toward the last showed something like 70 types on the books at once. For this mistaken policy, the flying officers of the Jap Navy concurred in blaming the General Staff for ordering out a new model whenever combat conditions changed.

And here, in the field of production, according to Soemu Toyoda, the Admiral King of the Jap Navy, was the seat of the whole trouble.

"It was a situation that we in the Japanese Navy realized even before the war," Admiral Toyoda explained. "Even then, in the United States, machinery did the work; in Japan it was men. With our dense population we did not change then for fear of unemployment. In the war we had to adopt machine production but we could not convert the nation quickly enough from its traditional hand labor. This was the basic cause for the failure of our war effort."

Enemy Equipment Intelligence

by Colonel Paul N. Gillon*

THE rapid rate at which new weapons were developed during the war as well as the great disadvantage under which we entered it made acquisition of technical intelligence of the enemy's combat matériel, especially in the field of ordnance, vitally urgent. Steps were therefore taken very early in the war to secure, train, and place in the field, officers and enlisted men specifically charged with securing all possible technical intelligence on enemy ordnance. As the need arose, technical services other than ordnance organized similar groups and placed them in the field. The activities of these groups gained important information, and with their growth and augmentation it became increasingly apparent that the integration of all such activities was highly desirable. Accordingly, early in 1944, the Army Service Forces Enemy Equipment Intelligence Service Teams were initiated by General Somervell, then Chief of Army Service Forces. All technical services of the army were represented. The difficulties encountered were great, because there was no precedent for such an organization.

The team as eventually organized provided for 14 officers and 22 enlisted men. Personnel was assigned from the following technical services: Ordnance, Signal Corps, Chemical Warfare Service, Engineer Corps, Quartermaster Corps and Medical Corps.

The mission of ASFEEIST was the acquisition, examination and disposition of captured enemy matériel and related data. Its work made it possible to provide accurate and prompt knowledge of new developments, or new techniques in the use of enemy equipment to the various research, development, and design agencies within the technical services of the War Department, as well as to the appropriate staff agencies in both theaters of operation and the zone of the interior.

Headquarters were maintained at Oahu. Since the isolated campaigns of the Middle Pacific involved the taking of islands at great distances from Oahu, the team was organized into forward and rear echelons. The rear echelons were kept at a minimum, so that a carefully balanced team could accompany the assault troops.

ASFEEIST personnel did not arrive in the theater in time to send a balanced team on the Marianas operation; however, a few representatives of Ordnance, Signal and Medical services of the team were able to participate in the operation, or to visit the Marianas shortly thereafter. The results were extremely satisfying, and much Japanese matériel was obtained and evacuated.

The Leyte campaign was the first sizable Pacific operation in which the team participated. This operation provided the basis for the planning which was done for the subsequent Iwo Jima and Okinawa operations. A total of seven officers and 14 enlisted men participated in the ASFEEIST phases of the Leyte operation. The matériel captured here was shipped to the United States for examination and analysis.

After participating in the Leyte landings, ASFEEIST took part in the Iwo Jima operation, during which it collected and analyzed many items of enemy equipment that were of intelligence significance, particularly rockets, other ordnance and signal matériel.

The final campaign of ASFEEIST was the Okinawa operation, where sizable quantities of matériel were recovered for shipment. One of the most significant contributions of the organization on Okinawa was its conduct of field tests on Japanese demolition matériel and the Japanese 47mm antitank gun.

The primary function of ASFEEIST involved the collection and dissemination, not only of Japanese equipment, but also of information regarding such equipment. The contribution made by ASFEEIST to the training program of American troops should not be overlooked, however. Many reports for this phase were written in the field very close to the point of capture of matériel. Technical analyses of important Japanese items of equipment were prepared by both its forward and rear echelons. Also, numerous items captured in forward areas were returned to the interested services in the United States for analysis in the army's laboratories. Wherever two or more items were found, one was shipped to the mainland and one retained for analysis by ASFEEIST personnel. Further work, such as metallurgical examination, was carried out in the great laboratories of America's universities.

The two functions of analysis of matériel and the training of troops concerning the matériel are complementary and consequently as the war progressed, the activities of ASFEEIST relative to the training phase increased considerably. All items of equipment not urgently needed for technical examinations were utilized first for training within the theater and second for training purposes within the United States. Large quantities were shipped back to the mainland for the latter purpose. The training of troops within the theater relative to enemy equipment extended to most of the important types of equipment which the combat soldier was likely to encounter. An appreciation of the significance of this training can be had by considering the shoulder weapon. In night fighting the recognition of the sounds made by various types of rifle fire is of extreme importance. Accordingly, classes were conducted by ASFEEIST with Japanese 7.7 rifles which it had

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*Ordnance Department. In charge of ASFEEIST in Middle Pacific Area, April, 1944, to August, 1945.

acquired in the forward areas and firings were conducted in comparison with our own M1, in order to demonstrate to the doughboys the difference in the report and the spacing of the rounds. In addition, familiarization firings with other weapons were conducted for the troops in order that they could appreciate the capabilities and limitations of the weapons which they might encounter. Similarly, instructions were afforded in many other categories of Japanese combat equipment.

It is interesting to note that ASFEEIST personnel were called everything from battlefield scavengers to professional souvenir hunters. However, both of these rather uncomplimentary terms fail completely to convey a proper idea of the manner in which ASFEEIST personnel operated. Contrary to the inference which one might draw from such terms, the forward echelon of ASFEEIST always operated with the front-line units. If it were not for this fact, little matériel of significance would ever have been obtained because forward combat units are prone to destroy enemy equipment which they overrun in order to prevent its subsequent use by infiltrating enemy patrols. Frequently it was necessary for ASFEEIST personnel to investigate underground localities before they were examined by combat troops, and the time available for such investigations was normally very short before the engineers sealed shut the caves by demolitions.

As an example of important inferences with regard to decreasing Japanese resources that were drawn from items investigated by ASFEEIST, it was found that textiles on Okinawa had been adulterated with hemp, that steel was being substituted for brass in cartridge cases, and that buckles on newly issued field bags were cloth-covered bamboo.

Numerous technical intelligence bulletins were prepared and disseminated on all categories of captured matériel. These bulletins ranged from a guide for identifying the markings on Japanese ordnance to complete reports on fire control equipment.

The ordnance section of the team sent back thousands of Japanese artillery pieces, mortars, rifles, revolvers, automatic weapons, and rounds of ammunition. In addition a complete set of Japanese fire control equipment was sent to Aberdeen Proving Ground. The other technical services made similar contributions in their fields.

Nearly 250 tons of Japanese ordnance matériel alone were returned to the United States for both intelligence and training purposes. These shipments included automotive vehicles, small-arms weapons, grenade launchers and rocket launchers, and artillery including both field and antiaircraft, twin mount cannon, and howitzers. The miscellany of fire control matériel sent included range finders and height finders, which represented practically the entire Japanese endeavor in this field.

The Signal Section unit, consisting of four officers and five enlisted men, carried out a training program of lectures and demonstrations covering the salient features of enemy signal equipment, and also issued numerous bulletins on enemy matériel. It captured a Japanese document on auxiliary receivers used in division communication units. It returned to the States for study and use in training, six tons of enemy signal equipment which included radar, radio tubes, crystals, wave meters, radiosonde receivers, direction finders and transceivers. In its Oahu laboratory, Jap signal equipment was studied, and circuit diagrams prepared.

The work of the Chemical Warfare Service unit, which was composed of one officer and four enlisted men, consisted of interrogation of POWs. The unit assisted in training 5,000 troops in the identification of Japanese chemical warfare matériel, and prepared more than 50 reports on it. The reports included analytical surveys of such matériel, and covered items ranging from filter paper and jettisonable fuel tank fire bombs to anticarbon monoxide canisters with which the Japanese army was equipped. New items found were shipped to the States for study. The Japanese entered the Pacific Ocean areas fully equipped for gas warfare, and it was apparent from examination of their chemical equipment that they fully expected gas would be used against them.

The Engineer Section unit, of one officer and two enlisted men, working in the same manner as other sections, sent to the States 23 tons of equipment. Japanese surveying equipment was much in evidence. A searchlight reflector was captured and found to be of German manufacture. Three complete Japanese filtration units were sent to the Chief of Engineers for analysis in the United States.

The Quartermaster Section unit, consisting of one officer and two enlisted men, sent reports out on such items of enemy equipment as bulletproof vests, gasoline lamps, portable fuel pumps and protective clothing. One such report compared U. S. and Japanese combat packs.

The Medical Section's contribution to enemy intelligence information was analyses of Japanese morphine, reports on the prevalence of diseases, and issuance of warnings to troops on several poisonous plants which abound on various islands. One item of considerable interest, which was forwarded with other matériel, was a Japanese microscope. A system for the identification of enemy antimalarial drugs also was originated by the medical section.

The lessons learned in the Pacific as a result of the work of ASFEEIST played an important part in the development of matériel by the technical services in the United States Army. By the process of analyzing every new item of enemy equipment the trends in the development of enemy matériel were deduced.

It is not sufficient, however, merely to make tests of enemy matériel to determine such obviously important knowledge as the range of his ammunition, the light intensity of his flares, the comfort of his field uniforms, or the effectiveness of his medicines. What is absolutely essential for appraisal of the captured item is that it be minutely scrutinized by all appropriate scientific facilities available for the job.

"BULLETPROOF" VEST

WOULDN'T it be wonderful if the following statement was true?

"A new type of protective armor for the individual, pliable as silk, light as a feather, but which will turn any projectile up to an eight-inch shell, has recently been invented."

Such a statement, however, is perhaps as far from the truth as it ever was, and yet the attempt to develop individual armor which will reduce battle casualties continues.

"Good" protective armor is a relative thing. It must afford considerable protection without unduly impairing the battle efficiency of the wearer.

Protective armor for infantry has not been a practical thing for several centuries. Towards the close of this war a new type of protective armor for the individual was developed, however, which may prove to be sufficiently practical to warrant its wear under battle conditions. This armor is a fibrous rather than metallic structure. The plates of this armor are not pliable, they do weigh more than a feather, and they will not turn every projectile which the mind of man has conceived. They will not turn a rifle bullet fired at a medium range. Encasement in an armored vest of this material will not eliminate the possibility of the individual receiving a chest or abdominal wound.

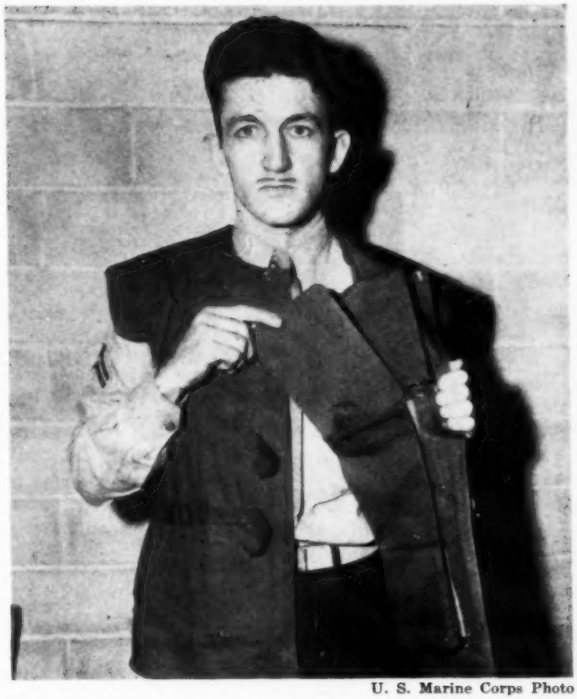
An armored vest of this material is not as comfortable as an old sweater. Yet it may be sufficiently comfortable and offer a sufficient measure of protection to warrant its adoption for battle wear.

The vest is not unduly heavy, weighing approximately five pounds, with plates one-eighth inch thick. Since the plates of the armor are not pliable, they cannot be extended to cover the lower abdomen and at the same time allow the individual sufficient freedom of action. The extension of the plates to cover the lower abdomen causes chafing and discomfort if the individual does much climbing, running, or engages in other vigorous activity. On the other hand, the lower abdomen is somewhat protected by the cartridge belt, and the plates may protect all the body above the belt line.

Undeniably, the vest is hot—a disadvantage less apparent in cold climates.

Since it is hot; since it is cumbersome, if not unduly heavy; since it won't turn a rifle bullet, what good is it? The answer lies in the fact that not all wounds are caused by rifle bullets. The armor will turn a .45 caliber bullet. It will turn most, but not all, fragments. It would turn a larger percentage of fragments if it were thicker, which would also increase its weight.

The percentage of deaths resulting from wounds in the chest and abdomen is high; studies indicate that the figure runs in the neighborhood of 50 per cent.



U. S. Marine Corps Photo

The number of casualties from fragments is generally greater than the number of wounds inflicted by small arms—some campaigns in the Pacific being exceptions.

The armored vest would markedly reduce the number of wounds of a type which so frequently result in death. By how great a percentage would it reduce wounds in the chest and abdomen from fragments? The answer to this question may not be given definitely, but very limited tests have indicated that one-eighth inch thick plates will turn approximately 75 per cent of fragments of a 60mm mortar shell and two-thirds of the fragments of 81mm mortar shells which have traveled a distance of 10 to 40 feet. The distance is, of course, only one of several factors upon which the chances of penetration depend. In the case of fragments from the same shell, some may penetrate, others may not. The armor gives greater protection against hand grenades.

This type of armored vest might not only reduce the number of casualties resulting from fragment wounds of the chest and abdomen, but might (let's be optimistic) possibly reduce the percentage of deaths resulting from such casualties, since the multiplicity of wounds to a given individual from a given shell may be reduced.

These vests were not tested in combat. The nearest they came to it was the wearing of a few of them during the mopping up phase on Okinawa. This test did provide some information as to faults of design.

This armored vest will not provide complete protection to the upper body, any more than the helmet provides complete protection for the head. It is not completely comfortable for wear at all times, any more than is the helmet. But like the helmet, it may now offer sufficient protection and be sufficiently comfortable to make men willing to wear it in battle.

Patrols In the Jungle

CONCLUSION

An article in the March-April issue of *The Cavalry Journal* described the basic considerations which govern the operation of jungle patrols, and included such subjects as the patrol's size, assembly points and objectives, maintenance of direction, equipment, etc. The following article describes formations that are adapted to both jungle and normal terrain.

IN jungle terrain, either on trails or in the bush, patrols will operate in column formation most of the time. It is generally not feasible to have a number of separate groups hacking their way through the thick growth at the same time; progress is too slow, the elements of the patrol become isolated, and too much noise results. Movement through the undergrowth is of necessity by column. Nevertheless, provision is made for flank groups in all jungle patrols. Even though these groups may not function on the flanks during forward movements, they do move out to the limit of visibility, up to 100 yards, during halts when march outposts are established. When normal terrain is entered, the designated flank groups begin to function on the flanks in the usual manner. Jungle formations of eight men or larger may be regarded as collapsed formations, which have been drawn together by terrain restrictions, but will open out to the normal form when the restrictions are no longer present.

Three-Man Patrols (Scout Team)

This formation consists of one man, armed with a rifle, who acts as a point and who is followed at 10 to 20 yards by a second man, also armed with a rifle, who in turn is followed at from 10 to 25 yards by the third man, who carries an automatic weapon. (See Figure 1.) The leading man gives his entire attention to observing the ground in the front and flanks, the second man looks for tree targets, the third man furnishes the fire power for protection of the group, and observes to the rear. The distance that is maintained between individual members of the team will vary with the visibility, as conditioned by the cover, bends in the trail, and whether the patrol is operating in daylight or in darkness. All members of the team must be constantly within visual distance of one another in daylight in order to afford mutual protection and control. At night, sound signals must be used and distances reduced.

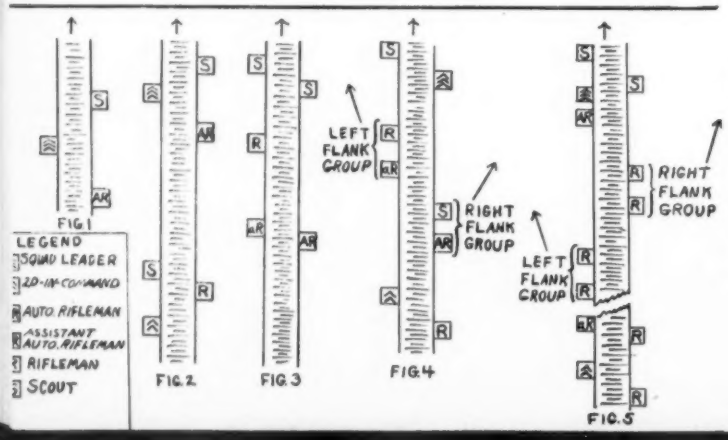
The three-man patrol, or Scout Team, should be used on jungle trails as the point of a larger patrol, or as a small reconnaissance patrol which is to operate alone. It may also be used effectively to replace the usual scout screen employed by combat platoons during their approach march.

Four-Man Patrols

When the three-man scout team is to operate alone as a patrol, a fourth man may well be added to the group so that the leader is not required to do his part of the three-man job, but can devote his attention to planning, and supervising, the conduct of the patrol. The efficient action of the basic team is thus preserved, and it can be controlled more effectively.

Six-Man Patrols

There are two methods of utilizing six men in jungle patrol formations. Whichever formation is selected, it should be appropriate to the terrain and visibility. In one the six men are arranged in two three-man scout teams, one ahead of the other, separated by a distance of from 15 to 50 yards, depending upon the visibility. The patrol leader is part of the leading team. (See Figure 2.) This formation permits flank movements by the rear group if the forward group is pinned down by enemy fire, and it also minimizes the danger of ambush



of the entire patrol. The rear team can act as support group for fire and maneuver to extricate the forward group from a dangerous situation.

At other times a simple doubling of the basic three-man team works well, although there is a greater danger from ambush if members become closely grouped. (See Figure 3.) In this case the two leading scouts observe over a 90° arc to the front and opposite flank, the two following observe for tree targets on the side of the trail opposite to them, and the two automatic riflemen cover by fire any targets on either side of the trail. The control, the detailed observation, and the concentration of fire power that are made possible by this formation are favorable for the rapid location of enemy positions along trails, and effective subsequent action.

Seven-Man Patrols

When two basic scout teams are used on a patrol, efficiency is increased if the leader is not a member of either team, but is free to supervise the entire patrol. The seven-man patrol is generally superior to the six-man patrol because of the opportunity for better leadership. The leader will usually be with the leading group unless the patrol is on a well-defined trail.

Eight-Man Patrols

One natural formation for the eight-man patrol is the same as that for the six- and seven-man patrols, except that the leader and his second-in-command are both free to move about as the situation requires. The most suitable formation for eight men, however, is the normal diamond, with flank groups collapsed, and in column on the track during movement. While moving, the leading scout pair, which will include the leader, performs its normal point functions; the next two men are designated as a right flank group; the next two men form a left flank group, which observes to the right and left respectively; and the rear pair become the rear point and function as such. In column on the trail, the groups are separated from each other by from 10 to 15 yards. Upon halting, the flank groups take up flank positions off the trail and the diamond formation develops. When normal terrain is entered, the flank groups move out and the normal diamond formation is resumed. (See Figure 4.)

Twelve-Man Patrols

Because of the canalizing terrain of the jungle, the same principle of using a collapsed diamond formation for eight-man patrols applies equally well to 12-man or larger patrols. The 12 men are organized so that three-man scout teams constitute the point and rear point, and scout pairs act as two flank groups. The leader is in the point group. On the march, all groups are in column behind the point, and are separated by 10 to 15 yards, depending on visibility. Upon entering normal terrain, and at the halt, the normal diamond form is adopted by having the flank groups move out at appropriate distances. (See Figure 5.)

FORMATIONS FOR NORMAL TERRAIN

The basic formations described here are not new, and have been used under normal terrain conditions for a long time. They are applicable to a great deal of terrain, and should be employed whenever conditions permit.

Eight-Man Patrols

Although an eight-man patrol may be used in a number of formations—and under certain conditions they should be used—the more common one is the diamond formation. In it the eight men are generally arranged in pairs to form the four points of the diamond. In operation, one man of the leading team observes for ground targets, while the other man, the leader, looks for tree snipers. The flank men operate similarly, with the outside man, who is the ground observer, in advance of the inside man, so that the protecting fire of the inner scout will be directed away from the patrol when his partner encounters resistance from tree snipers. The rear pair divide responsibility by having one man observe to the rear and one flank, while the other watches the patrol leader and the other flank. To facilitate control, all inside men keep in visual contact with the leader. Direction of movement of this formation is easily changed upon signal toward either flank or to the rear without interrupting the formation or the functions of the individuals.

Nine-Man Patrol

This patrol functions in the same manner as an eight-man patrol, except that the leader is free to move from place to place as the patrol changes direction instead of serving as an integral part of a two-man scout team. There is a considerable advantage in having the leader more "mobile," although usually he will be with the point.

Twelve-Man, and Larger, Patrols

The Diamond Formation—Four groups of two or three men each are arranged so that the entire patrol is in the shape of a diamond. Individuals within each group are separated by from 5 to 10 yards. The point and rear point groups are essentially three-man scout teams. The flank groups, of two men each, place themselves in such a position that the outer scout is slightly ahead of the inner. The leader will normally be with the leading group. Intervals and distances between the four groups of the diamond will vary according to terrain conditions, cover, visibility, and proximity to the enemy, but the front-to-rear axis of the diamond seldom will exceed 150 yards. The frontage covered will be limited by the visibility. Advantages of this formation are the all-round protection provided, the rapidity with which its direction may be changed, and the ready control it permits the leader. If attacked, the group has an all-round defense immediately available.

The Squad Column—In this formation, the men are arranged in a single column with the leader at the head.

In the column, individual members of the squad take a distance of from 5 to 10 yards from each other. The two-man scout teams stationed on the flanks may take an interval of 100 yards from the column, if visibility permits. The patrol sends two scouts forward and two men to the rear. This formation allows a great rapidity of movement and a maximum of flexibility in control. A small frontal target is presented to the enemy, and a maximum of flank observation is possible. Also, when a change in natural cover requires more detailed examination of the ground, it permits a rapid change to the skirmish line formation.

Skirmish Line (T Formation)—The men are spaced at intervals of from 5 to 10 yards in irregular line. The command group of the patrol precedes in column usually at a distance of 10 to 75 yards, depending upon visibility. Men are assigned to flank groups and detailed to observe and reconnoiter on signal. This formation has the advantage of dispersion, and permits the examination of a wide front thoroughly as well as visual communication between members of the patrol. Control during daylight is maintained by relaying signals from man to man, and at night by voice or other sounds.

Wedge Formation—Individual patrol members are arranged in such a way that a scout pair or a three-man scout team, including the leader, leads the way. They are followed at 10 to 75 yards, depending upon visibility, by men uncovered to the left and right by intervals of 5 to 10 yards. The customary dimensions per squad are a frontage of up to 100 yards, and distance from front to rear of approximately 100 yards. This formation provides the advantage of close coverage of terrain over nearly the same frontage as the skirmish line and, at the same time, it facilitates thorough observation to the flanks. Each man has a relatively small sector to observe. It provides the same ease of control of a squad column and, in addition, it may be rapidly changed to an all-round defensive group in case of attack. The end men on the two sides of the wedge are charged with observation and protection of the patrol from the flanks. Two men, led by the second-in-command, constitute the rear point. The formation has a wide adaptation and may be used in either open or close terrain, but it is not suitable for work on trails or other canalized approaches.

Report of Patrol Leader

Upon returning from a patrol, the leader makes a report to the commanding officer who sent him out. The report should be written unless the situation at the time is too mobile to permit it. The report covers the following points:

Size and mission of the patrol.
Time and departure route.
What was observed—number—composition, equipment and attitude of the enemy.
Where observed—doing what, and direction of movement, if any, with exact location.
When observed.
Nature of terrain covered.
Route and time of return.
Condition of the men and casualties.

Reports may well take the form of overlays upon which the pertinent information above may be accurately plotted, and explanatory marginal notes added, as required. Information in overlay form is readily transferred to unit situation maps and is usually more accurately reported than is possible by the use of words.

Illustrative Patrol Problem

First Phase: The following verbal order was issued by the company commander at 0600L, November 17, 1942:

"Sergeant, I have an operation map here—get where you can see it.

"An enemy infantry battalion with some pack artillery is advancing south along the coast and was reported to be in the vicinity of Pongani yesterday afternoon" (pointing to location on map) . . .

"Our battalion will march from our bivouac here at Kinjaki to Pongani on the morning of November 20. An Australian patrol will be sent to the vicinity of Pongani today.

"Take seven men of your squad as a patrol to determine the presence or absence of the enemy and their number in the vicinity of Pongani. You will observe and report the condition of the trail" (pointing to trail on map) . . . .

"You will prepare your men for the patrol and move out at 0800L today. You will report to the battalion commander by 1200L day after tomorrow. You will meet the battalion at the stream junction south of Pongani, here" (pointing) "on November 20 to act as guides. Do not engage in a fight unless it is necessary.

"Take enough rations to last five days. See that your patrol has at least three compasses. Each rifleman will take 40 rounds of ammunition and each automatic rifleman will take 120 rounds. Take one pair of field glasses, a pair of wire cutters, and a watch.

"Battalion CP—Kinjaki until 0600L November 20.

"Send messages to the battalion CP.

"Any questions? It is now 0615L."

Second Phase: After a short period for study of the requirements, the squad leader assembled his patrol and gave the following warning order informally in his own words. He made sure that each man understood what his particular job was before continuing. He did not announce paragraph numbers.

Warning Order

"Natives report that an enemy infantry battalion and some pack artillery were in the vicinity of Pongani yesterday afternoon, November 16th.

"Our battalion marches on Pongani from Kinjaki

November 20th. An Australian patrol will be operating in the vicinity of Pongani.

"Our patrol will march on Pongani at 0800L to report the presence or absence of enemy in the vicinity. Route of march: the trail shown here on my map. We must observe and report the condition of this trail.

"I want you men to draw five days' rations from the mess sergeant: Graham, take 120 rounds for your tommy gun. Brown, check the ammunition the other men have and draw enough from the supply sergeant so that every man will have 40 rounds. McDougal" (second-in-command), "make a tracing of my map, draw a pair of field glasses from the supply sergeant and be sure to bring your compass. Graham, draw a pair of wire cutters. Gilucci, draw a compass. Fall out and assemble here at 0745L. It is now 0630L. Be sure you have good shoes, no shiny equipment, none that rattles, and no insignia. Leave all papers, letters, documents that would identify us, at the company orderly tent."

After preparing his own equipment, the squad leader studied his map and prepared his order for the patrol. The squad reassembled at 0745L. The squad leader had them fall in and inspected them to see that all of the provisions of the warning order had been carried out. After the inspection was completed, the squad leader rapidly repeated the first three paragraphs above, and then continued his order as follows:

ORDER

"Brown and Cohen to the left.

"Gilucci, you are air scout. Work in a pair with McDougal. Have you got it?

"McDougal, observe to the rear. When I have gained 50 yards distance send the squad forward in squad column formation, opened out, seven yards interval, five yards distance. Watch me for signals. Got it?

"Graham, work in a pair with me. We will precede the patrol by 50 yards.

"First objective: our outpost line 800 yards north. The trail passes through it as shown here on the map at this stream crossing.

"First assembly point: right here.

"Password: Powder River.

"Report any enemy you see to me. Fire on my order only. Don't shoot first but take cover and watch me for signals. If I am bumped off, our messages are sent to the battalion commander here. We must report by noon November 19th. We rejoin the battalion on the trail south of Pongani November 20th to act as guides for the battalion. I will designate the exact location when we pass it.

"All of you watch out for airplanes and gassed areas.

"Do you understand what you are to do: Do you, Marcinski? If you don't, now is the time to ask questions, not down the trail.

"Alright Graham, move out. I'll follow you at 15 yards. Watch me for signals."

Third Phase: The patrol moved out to its first objective in opened-out squad column formation, because it was in territory within its own outposts. When this point was reached, a new objective was designated and a new assembly point was pointed out on the ground near the old objective. Upon entering territory outside of our outpost line, the squad again took up the opened-out squad column formation which was suitable for rapid movement along the trail.

As the patrol approached Pongani, however, more care was exercised by adopting formations in normal terrain with more dispersion, such as the diamond, skirmish line or wedge, depending upon the type of cover. When traversing jungle terrain the eight-man jungle patrol formation was used.

During each halt, march outposts were established and the bivouacs on the nights of November 17–19 were protected by double sentries working in three reliefs. Slit trenches were prepared in a form to give all-round protection in case of attack during the night.

On the morning of November 19, the patrol observed an enemy patrol of six men on the trail south of Pongani. They were going north and were talking freely as they proceeded along the trail. The message sent to the battalion commander was as follows:

"MESSAGE. No. 1. To: CO, 1st Bn. 19 November, 1942.

"No enemy troops observed west of Pongani to 0630L 18 Nov. Observed six-man dismounted enemy patrol moving north on Pongani-Kinjaki Trail 300 yards north of point where Mangare Ck. crosses the trail at 1030L today. Enemy careless and noisy. Will continue mission.

Leader Patrol No. 1
1040L
Gray, Sgt."

Fourth Phase: On the afternoon of November 20 the patrol met the battalion at the stream junction south of Pongani and the leader submitted the following report to his company commander:

"Patrol of eight men, with a mission of determining the presence or absence of the enemy in the Pongani area left Kinjaki at 0800L 17 November and followed the main track until the stream crossing over Mangare Ck. was reached. At this point the patrol left the trail and reconnoitered the area to the west of Pongani—saw no enemy. At 1030L on November 19, a six-man Jap patrol was seen on the main track going north 300 yards north of the Mangare Ck. crossing. They were talking and had no security groups out.

"Terrain was hilly and intermittent patches of kunai grass and tropical forest. Native trails are abundant in the area southwest of Pongani where many villages are located. All trails passable for foot troops and bantams. The patrol returned to the stream crossing over Mangare Ck. this morning. The men are in good condition, although Gilucci has a blistered heel.

Gray, Sgt.
Leader Patrol No. 1."

Two Years Under Wingate

by Brigadier Bernard Fergusson, D.S.C.*

SOME hours after dark, during a thunderstorm on March 24, 1944, a B-25 crashed into a remote hillside in southeast Asia. Four Americans and four Britons were killed. A week later, the Japanese burst into Rangoon jail, chattering in exultation, to tell the Allied prisoners that Major General Wingate was dead.

At the moment the catastrophe happened his brigades were poised to close in on their objective of Indaw, a small town in Upper Burma, 140 miles down the railway from Myitkyina. Only the day before, Wingate had flown in to discuss plans for the assault with me. He had landed on a light plane strip, located 25 miles short of Indaw, that I had constructed for the purpose. Deployed in the surrounding jungles were nearly 2,000 of my men; 11 months earlier, in the same area, I had been sneaking out to India with 30 men, some wounded, most of them sick, and all near to starvation.

What was the difference between the campaign of 1943 and that of 1944? What lessons had been learned in the first, and how were they exploited in the second? What was the object in each year, and what was the gain?

Two years after Wingate's death, it should be possible to view his two greatest campaigns in perspective, and to make some assessment of his own worth, unswayed by the emotions of the moment and undazzled by his almost hypnotic personality.

*Staff of Combined Operations Headquarters.

Lessons of 1943

The 1943 campaign was no more than a demonstration; its aim was no higher than sabotage. Wingate's purpose was to penetrate far behind the Japanese lines, to play havoc with the Japanese supply system, to tie up Japanese troops on unprofitable guard duties, and thus to help the main armies in their grand advance. He proclaimed that two modern aids to war had not been fully exploited by the infantry: the first was air supply, the second radio.

Hitherto, air supply had been used only in emergency —when troops had found themselves surrounded. The Australians had used it in New Guinea, and Koenig's Fighting French at Bir Hakeim. Wingate was sure that it was reliable as the sole means of supply over a long period.

All that could be allotted him in the way of aircraft was three C-47s and two Hudsons. The Hudsons flew so fast that the canopies were stripped from the parachutes as soon as they opened, so we had to fall back on the three C-47s. Yet the system worked, and the greatest direct result of the expedition was the confidence which it engendered in air supply—a material contribution to the winning of the war in the East.

The offensive which the expedition was planned to help had to be postponed, and as a result the expedition itself came within an ace of being cancelled. But we were all keyed up to go. Wingate wanted to demonstrate that he could do what he claimed; all of us wanted to confound the skeptics. General Wavell acceded to his request, and on February 5, 1943, accompanied by the American General Somervell, General Wavell wished us good luck at Imphal.

I next saw Imphal on April 26. I had reached the first British post on the west bank of the Chindwin River two days before. Wingate was still missing, but was to turn up three days later. We had come out in the small groups into which we had split when surrounded by the Japanese who had encircled us on the far side of the Irrawaddy during the last week of March, just after we had turned for home. Most of us had had a bad time. We had been forced to jettison all our mule-loads, including wireless sets, with the result that we no longer could get food dropped from our faithful allies of the RAF. In my own small party a number of men had been lost from starvation: we had had one period of 11 days on three mugfuls of rice and

two malted milk tablets per man. The losses over the whole force finally came out at 35 per cent, of whom some were recovered two years later, when Rangoon was recaptured.

On the asset side, apart from demonstrating the possibilities of air supply, we had killed a fair number of Japanese; learned a lot about tactics and topography; given the enemy a great deal of irritating exercise in marching and countermarching; damaged their main railway, though not lastingly; and learned much about their defensive layout in the area. We had established also the temper of the inhabitants of the country, who had proven strongly pro-British and anti-Japanese. For every one that had double-crossed us from motives of fear or greed, a hundred had helped us at the risk of their lives, particularly when we were stumbling out hungry, sick and wounded. I know of one in particular who was mutilated and then tortured to death and yet did not divulge the hiding place of one of my wounded officers whom I had had to leave behind.

Moral Suffering

Of our sufferings, the worse were moral. Before leaving India, we all had realized that any man who was too sick or badly wounded to keep up our pace must drop out. Of all those whom I had to leave, not one complained or made it more difficult to leave him than it already was. The first party I left consisted of five wounded. All fell into Japanese hands and only one survived. My adjutant and his orderly also were captured. He was an Australian officer of my own regiment, the Black Watch, who had been in the Tobruk siege with me. The Japanese shot them both. Altogether, out of my own column of 318, 95 reached safety; and of the 80 who were taken by the Japanese to Rangoon, only 28 survived the two years of imprisonment.

A word about our loads and our food might be of interest. Every man carried 72 pounds of kit, which included seven days' rations, rifle and bayonet, jungle knife, three grenades, spare shirt and trousers, blanket, waterproof sheet, four pairs of socks, life jacket, water-bottles, and miscellaneous. We had no special kit, just the old prewar issue articles.

Our daily food ration was 12 biscuits, two ounces of cheese, two ounces of nuts and raisins, some dates, 20 cigarettes, acid drops, tea, sugar and milk. One day's rations weighed two pounds. Our orders were, however, that seven days' rations must last 10 days. We were sometimes able to eke them out with meat off a mule killed or a buffalo bought for the purpose, or rice, until the Japanese got wise to us and garrisoned all the villages to stop our foraging.

The most welcome meal I remember was of raw buffalo meat—after being without food for three days we had come upon three buffaloes and could not wait to cook them. I recall another meal of 12 loose grains of rice which I found, black and dirty, in the bottom of my pack. My normal weight of 175 pounds had shrunk to 128 by the time I reached the British lines. Two ounces of that was a chunk of metal in my posterior off a grenade, which had joined up with me 350 miles short of home.

That was the 1943 campaign. There were several reasons why 1944 was different. One was that the first show had been adjudged worth while, and Wingate had won widespread attention to his case, as well as interest in what he was likely to propose next. The second was the vast strides which his quick mind had made through his latest experience. On the way back to India he had lain doggo for a fortnight to let the hue and cry pass him by, and had sorted out the lessons of the campaign in his mind while he waited for the coast to clear. The third reason was the powerful backing which he won for himself from Mr. Churchill and President Roosevelt, and their advisers, at the Quebec Conference in August, 1943. The fourth was the devotion and enthusiasm of the American airmen of No. 1 Air Commando, under Colonel Philip Cochran, who, as a result of Quebec, now came into the game with us and joined our family.

Wingate was not prepared to be content any longer with mere raids and sabotage. He was aiming higher. His plan now was to capture an enclave right in Burma —an all-around bridgehead far beyond the enemy's lines. Let the Japanese stew as they might in the hot, valueless jungles; we would overleap them, land from the air at some strategic point where we could build and hold our own airfields, and then fly in new formations to exploit from there. We knew the country now, and we had learned which were the key roads, the key garrisons, and the reinforcement routes between each. If we set up near Indaw we could at the same time starve out the Japanese facing General Stilwell's Chinese, who were advancing painfully over the Ledo-Hukawng Valley route, and exploit our enclave.

This plan failed only because, with the Japanese thrust across the Chindwin in March, 1944, all of the troops which Wingate had hoped would be available to exploit out of the enclave were eaten up in the need to defend Imphal. If Imphal went, the Japanese could reach the Assam railway, which maintained not only the British-Indian forces round Imphal, but also General Stilwell's forces based on Ledo.

Stilwell's Material Help

The plan has been criticized on the grounds that it failed to affect the "main battle." This has the elements of truth, although it is less generous than it might be. General Stilwell's advance was materially helped; quantities of Japanese were killed, and most of their reserves engaged—all, in fact, except those who were committed to the defense of the seacoast for fear of a seaborne invasion. But the real point is that the plan was devised to assist in an offensive battle, whereas, as things turned out, the main battle that season was defensive, through no fault of the plan. It became defensive largely because

the decisions made at the Quebec Conference could not be translated into reality for some little time, although they were hurried on at record speed. Cochran's air forces could not complete their assembly or deployment until February, and few if any other men could have completed these processes by then.

My own brigade was unlucky, in that, unlike the others, it was to march in again, in the old-fashioned style. We left Ledo at the beginning of February. The first of the flying brigades, Brigadier Mike Calvert's, was put down some 70 miles from Indaw between March 5 and 8; and the second, Brigadier Joe Lentaigne's, followed immediately after Calvert's. Mine reached the same area about March 22, after some hair-raising marching over much new country. (We marched 360 miles of the distance in single file.) But by this time the Japanese were pouring across the River Chindwin, subsisting on ration dumps which they had been piling up busily for many months past; they had not even any line of communications vulnerable to us. And then, Wingate was killed.

All April the fighting went on round about Indaw. The angry Japanese formations battered themselves to pieces on the blocks and strongholds which had set up under their very noses on the railway. The second week in May the Wingate force began moving north, to integrate more closely with General Stilwell's objectives on the line Mogaung-Myitkyina; and after the capture of the former town their task was at an end. In August they came wearily out. Casualties had been heavy, and sickness during the monsoon cruel, but all ranks were pleased with their achievement.

Much has been written and said about the actual airlift of Calvert's and Lentaigne's brigades, and rightly so. The technique of putting down gliders with bulldozers in unprotected country far behind the enemy's lines was new, and Lieut. Colonel Taylor's glider pilots did a wonderful job. But there was far more new stuff than that. The integration between the pilots and the men on the ground was the closest the war had seen, and all done by a nice mixture of radio, comradeship and mutual confidence. Allison and Olesen of the fighters, Mahony of the bombers, Rebori and his boys of the light planes—these American officers were far more than names to our men, but their names were known all through the infantry none the less. My own special ally was Colonel Clinton B. Gaty, who built my airfield, and lived on it with me for six weeks—a close and trusted comrade whose death occurred over Shwebo a year later.

I have said already how the most cruel feature of the first year was leaving behind the sick and wounded. In 1944 that was almost unknown, thanks to the L-1s and the L-5s of Cochran's force. They landed around villages on perilous strips which had been hastily smoothed in the paddy fields, then took off again with their emaciated wounded, and flew them back to the big strip, where British or American C-47s would come in at night to lift them back to India.

Broadway and Aberdeen

We had two principal bases in the heart of Burma. One was Broadway, the scene of the original glider landing; the other my own at Aberdeen. Broadway was in an area scantily inhabited even by natives; Aberdeen lay in a valley half a mile wide, with villages upstream and downstream, and a pleasant river, two or three feet deep, running through it. The C-47 strip, 1,200 yards long, ran due north and south. We were landing aircraft on it within three days after Colonel Gaty began work there. Our light aircraft lay tucked into the side of a hill up a little re-entrant, and their pilots lived beside them. Two defended hills covered the strip, each designed to hold one battalion in defense.

To please the villagers, and to induce them to work for us, we started a shop. In it we sold clothing, kerosene, and matches, and all the necessities of which they had been deprived under the Japanese. We paid them for working for us and then they could go and spend their earnings in the store.

Two brigades besides my own were based on Aberdeen. I was given two extra battalions to defend it, and seven AA guns. In point of fact we managed to keep the Japanese so busy covering himself from our punches that he never had leisure to try conclusions with Aberdeen except by air. Minor air raids occurred continually, but our barrage was good, and the Japs never got to close quarters. He caught us slightly once or twice, as when he shot down a C-47 just coming in to land (the pilot got her down without casualties), and again when he induced us to switch on our flare path and then dropped a bomb on the runway.

In 1944 we also fared much better in the way of food than in 1943. We never went hungry, and we had three pounds of food per man per day. I gather that the K ration is not popular with the GI. We thought it paradise, and lived on it for three and a half months, varying it only on the occasion of a supply drop when we got the addition of bully beef and dehydrated potatoes. We also got what the British soldier cannot do without—tea, sugar and milk.

A month under Wingate was worth two years in college. 1943 was pretty good hell. 1944 was all right. That second year 500 American airmen and several thousand British soldiers got to know each other inside out. If any of those 500 see these words, let them know that two Chindits cannot meet and gossip in Britain today without thinking of No. 1 Air Commando, and raising a glass.

Strategist

As for Wingate (who, unlike so many of his men, was found and buried), none who served him, British or American, will ever wholly free themselves from the influence of his character. Announcing his death in the British House of Commons, Mr. Churchill described him as "a man of genius who might have been a man of destiny."

Britain's "Swimming Tanks"*

BRITAIN'S secret "swimming tanks"—which went ashore on D Day to rampage among German pillboxes and knock out enemy guns before they could fire on the assault waves—are estimated to have saved the lives of 10,000 Allied soldiers.

These 40-ton seagoing vehicles, known to Allied armies only by the code letters DD, which stood for Duplex Drive, saved other lives by providing immediate and adequate tank support during the crossing of the Scheldt Estuary, the Rhine and the Elbe. They were to have been one of the surprises in store for the Japanese.

Standard tanks which are brought in close to the shore on landing craft make large and vulnerable targets. But swimming tanks—which are put into the water several miles offshore out of range of the coast antitank defenses, and which ride so deeply in the sea that they resemble infantry assault boats—present small and scattered targets.

The "swimming tank" was developed after a British inventor, during the early days of the war, began experimenting with a swimming device on a Tetrarch tank which was completely successful. Later, designs were perfected which led to the production of many DDs in Britain, and the manufacture of nearly 400 in the United States.

To make DD tanks buoyant, the hull was waterproofed, and a canvas screen was fitted on which could be raised and lowered. When the screen is in the raised position it extends above the turret level, so that when the tank is afloat only a foot or two of the canvas is above the water. The tank therefore looks like a collapsible infantry assault boat. Such an appearance proved advantageous and caused the enemy, on occasion, to engage the vehicles with small arms instead of HE fire. The resulting minor perforations had no effect upon the performance of the tanks, and the small quantity of water which was shipped was soon removed by the bilge pumps.

British Official Photos

Rubberized walls attached to tanks made them seagoing. Shown above in France are Shermans with the walls down.

When the tank reaches sufficiently shallow water to be borne on its own tracks, the screen can either be lifted up at the rear for protection from the waves, and deflated partially at the front so that the turret gun can fire—or the entire screen can be dropped. Either operation is carried out instantaneously, and once the screen is lowered the tank is a normal fighting machine.

During seaborne assault operations, the DD tanks can be launched from landing craft, move through fairly rough seas, and go into action immediately upon reaching shallow water in which the screens can be lowered. In still water, a speed of four or five knots per hour can be attained.

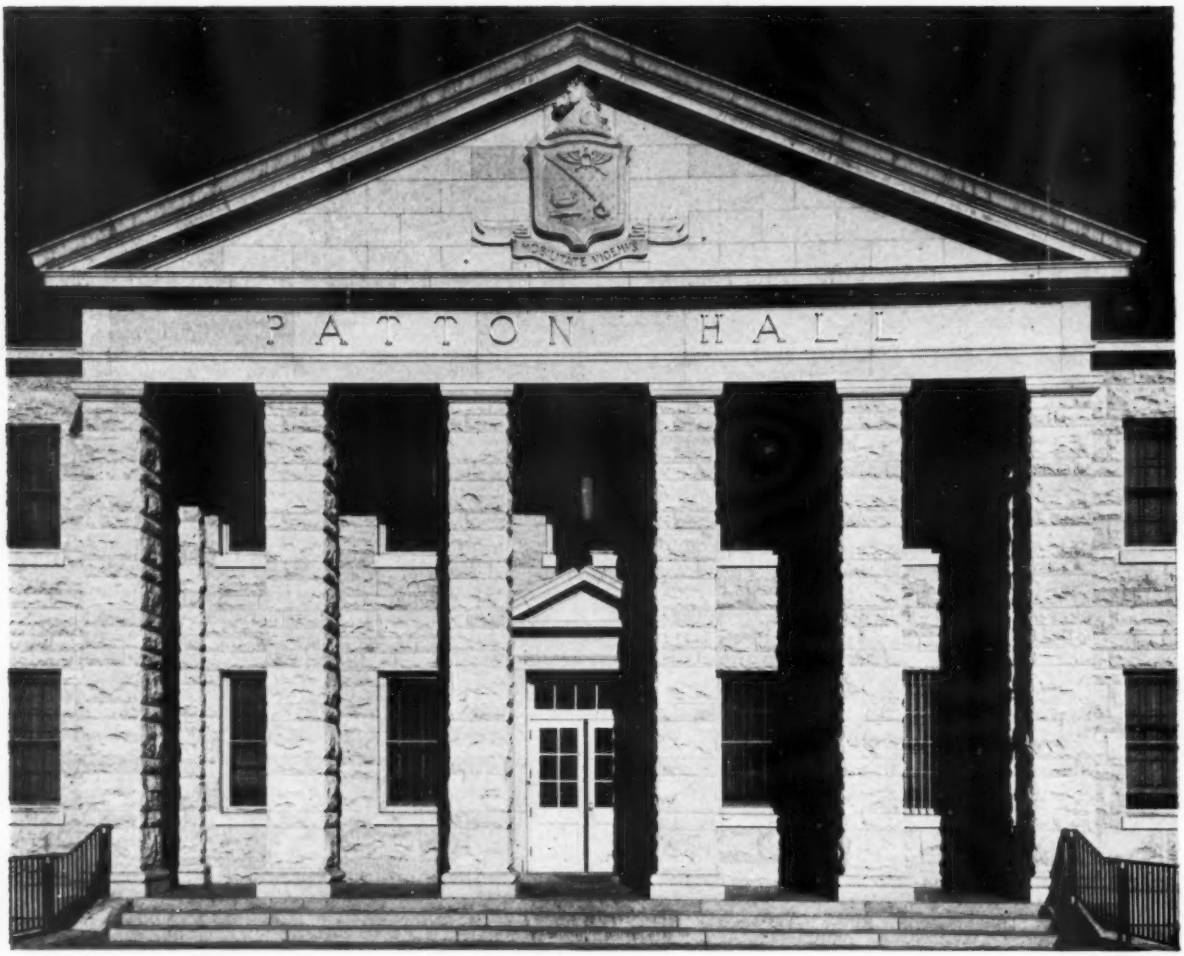
DD tanks can also help bring in supplies during the early stages of an assault by towing to the beach floating sledges loaded with ammunition and stores, which they can drag some distance ashore. Such sledges, known as "Porpoises," were successfully employed on D Day.

The tank is propelled through the water by twin propellers at the rear which are driven from the tracks of the tank, and that can be swivelled by tillers, left or right, for steering. The propellers are raised for the clearance of obstructions when the tank operates on land.

Various auxiliary equipment must be used with the tanks, including special periscopes and compasses for navigation, and a modified form of the Davis escape apparatus, which is worn by the crew.

*British Information Services.

With its walls up, a Sherman DD, capable of four to five knots in still water, crosses the River Adige in Italy.



Dedication of Patton Hall

THE name of George S. Patton, Jr., was sustained in stone at The Cavalry School in April before persons who had gathered from many parts of the world to pay homage to a man whose exploits are legend.

Five thousand persons assembled before the academic building of The Cavalry School to see Mrs. George S. Patton, Jr., widow of the famed general, unveil the 14-inch bronze letters marking the beautiful native stone structure as a shrine to her husband.

Secretary of War Robert P. Patterson and General Jacob L. Devers joined with scores of other high military dignitaries to pay tribute to one of America's topmost field commanders.

"No more fitting a place for a memorial to General George S. Patton could be chosen than here at The Cavalry School," Mr. Patterson said.

"George Patton, the soldier, was first and last a cavalryman. It is only right that his memory should be honored here. The honors we pay him, the monuments we erect to him, can be only poor reflections of his place in American history. The memory of the man himself will be enshrined by generations to come as one of the greatest of our soldiers.

"All his years he bent his efforts wholeheartedly to perfecting himself as a soldier.

"He had no use for half-measures. He wrote a few days before his death that anyone in any walk of life who is content with mediocrity is untrue to himself and to American tradition.

"Three basic principles guided his life. They were an unswerving will to master his profession, an unsparing devotion to duty, and an unshakable trust in those who served with him."

General Devers, commanding general of the Army Ground Forces, then recalled his acquaintanceship with General Patton.

"I am very happy and very proud," he said, "to be in this assembly to honor my late comrade.

"I have known George Patton since we were plebes together at West Point. He was a fine athlete, a gallant sportsman and a sure leader. He exemplified the unbeatable American qualities of competitive spirit and team-

work. With them he won great battles, both for country and for his ideals."

President Harry S. Truman wired from the White House:

"I can think of no more fitting tribute to the memory of General George S. Patton than the bestowal of his honored name upon the academic building of The Cavalry School.

"A brave and gallant fighting man, his memory will be an inspiration to all our soldiers through long decades to come. Please pay my tribute of respect to General Patton's valiant widow and to the other members of the family who mourn the loss of a loving husband and father."

Mrs. Patton spoke briefly before unveiling the shining bronze letters naming the building for her husband.

"This is the place of happy memories," she said. "In our 35 years of active service in the Army, Fort Riley has been the post nearest our hearts. There is not a corner of the reservation that we Pattons do not know and love."

Mrs. Patton recalled her husband's strategy as something "fresh as bread and as old as war."

"Four words define it," she said: " 'Imagination—what would I do if I were the enemy. Reconnaissance—where is he weak, for it is there I shall strike him. Audacity—keep him off balance and keep him rocking. Pursuit—run him down.' "

"All these are Cavalry functions, and will be taught in Patton Hall, the home of the modern incarnation of the spirit of the Cavalry—going ever forward."

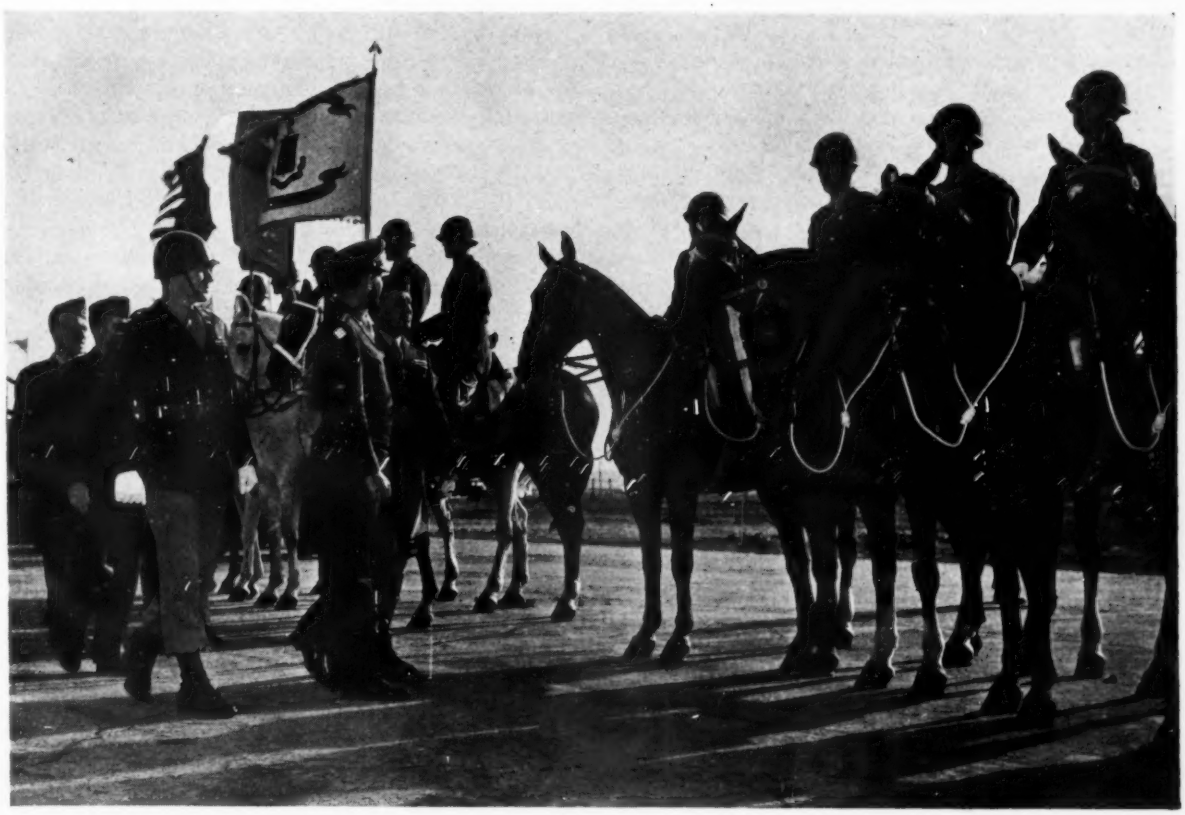
Special guests at the dedicatory exercises included Master Sergeant William G. Meeks, orderly for General Patton for eight years, who came here from Rome, Italy, and Staff Sergeant Paul Wiedorfer, Baltimore, Maryland, and Sergeant Davis E. Hardy, Richmond, Virginia, both former members of General Patton's famed U. S. Third Army.

Sergeant Wiedorfer is holder of the Congressional Medal of Honor, the nation's highest decoration for valor. He won the Medal of Honor for singlehandedly wiping out two German machine-gun nests on Christmas Day, 1944, which had pinned down his outfit near Chaumont, Belgium, in the historic Battle of the Bulge.

Among high military officers present were: Colonel Albert Le Bel, assistant French military attache, representing the French government, and Colonel Kenneth Mackessack, British military attache, representing Great Britain.

During the ceremonies, the Junction City High School a cappella choir sang "God of Battles," written by General Patton, and The Cavalry School Band played "The Second Armored Division March," written by Mrs. Patton.

General Jacob L. Devers and Major General I. D. White inspect the escort for the dedication of Patton Hall.



Fifth Army Transportation

*by Captain Cecil H. Scott**

WHEN the "push" started from Anzio, the transportation section of the U. S. Fifth Army really began to operate. The section at first had had very short turn-arounds from dumps to the forward area. When the army pushed through Rome, however, and kept gaining rapidly, Fifth Army transportation found itself faced with a long supply line over which the necessary gasoline, ammunition, rations, and equipment had to be moved regardless of the long distance back to dumps at Anzio and Naples.

At this time, base quartermaster truck battalions were located at Naples and Anzio. They were hauling supplies to new dumps located in and around Rome. Many times Fifth Army convoys were sent back to dumps at Anzio. During this time highways were crowded day and night. To handle this heavy flow of traffic and to keep supplies moving forward as fast as possible, the Fifth Army organized its truck battalions as follows: Each morning a report on the total number of trucks that could be operated for a 24-hour period was sent to transportation headquarters by all truck battalions, and all convoys were scheduled by transportation Movement Control. Convoy movement forms would be filled out with the following information: time of departure from battalion area; route to travel to dumps or railhead, and on to the dumps in the forward area. Transportation control points were set up along the main roads to check and control all convoys. Time for arrival and departure at these stations was entered on the Convoy Movement form. If a convoy checked in at a station early, it would be held up and put back on schedule. If it checked in late, it would be sidetracked, and Movement Control called for new time schedule for the remainder of the trip. In this manner all convoys were kept on schedule. Where possible main roads were kept open for loaded convoys. Empty trucks were routed back over secondary roads. Since Movement Control was in contact with all check stations, traffic could be kept moving on all roads. Movement Control was in a position to clear up jams by relieving pressure on any road using check stations to re-route convoys, or on all traffic if necessary.

The British Eighth Army, operating on the right, occasionally scheduled convoys through Fifth Army areas. This caused some traffic jams at first. Later, all British convoys were required to clear with Movement Control of the Fifth Army if they were traveling through a Fifth Army area. Generally convoys were scheduled to be away from their company area for as long as 30 to 40 hours. Some means had to be set up for refueling, checking trucks for flat tires and feeding drivers. Refueling points were established along the main highway; and time for stops was entered on convoy commanders' schedules. Messes were set up and operated by cooks drawn from the battalions concerned. Time was allowed for eating, and if necessary, changing flats. All drivers were briefed on the route to travel, time of departure from battalion area, and time of arrival at all check points. This was found to be of great importance. If a driver fell out of convoy he always knew where to go and how to get there. The convoy commander knew the cargo would get to its correct destination.

Highways in Italy were all built with very narrow shoulders. Where possible, trees had been planted 10 to 15 feet apart on both sides. If a truck was wrecked or broken down, it was almost impossible to clear the road for two-way traffic. To eliminate this, a wrecker patrol was organized. All main roads were patrolled day and night. If a truck needed only minor repairs it could be repaired on the spot; if wrecked it could be towed to its own area.

Truck operations were difficult in the mountains north of Florence. In the winter of 1944, ice, snow, and extremely cold weather were encountered. Wrecker stations were set up with wreckers and snowplows available on call. These stations were furnished the schedules of all convoys coming through. If a convoy failed to show up, the operator called back to the next station to see if it had cleared the convoy through. In this way a convoy would be halted only a short time before help arrived. When troops were to be moved, strict control of highways could be maintained, and troops went through without a hitch.

Trucks returning from long trips over rough roads were found to have loose bolts. Spring U-bolts were constantly working loose causing them to break. In order to insure that all bolts were checked after each trip, First Echelon maintenance check-teams were trained in each company. A team consisted of one sergeant and three privates. Regardless of the time a convoy returned, a team checked each truck over a grease pit or rack. They tightened spring U-bolts, propeller shafts, universal bolts, all body bolts, and the nuts on all gear boxes. The team was responsible for greasing each truck and checking lube in all gear boxes. With trucks checking in at all hours of the day and night, the team proved to be of great help in checking and servicing the vehicles and in putting entire convoys of 20 to 30 trucks back on the road in less than two hours.

In truck operation during a push, it is the number of trucks on the road that count, not the ones in second, third and fourth echelon shops. With these vehicles traveling an average of 150 to 200 miles each 24 hours, it is very important that convoy speeds be controlled and first echelon maintenance be performed regularly.

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*Department of Motors, The Cavalry School.

The ARMORED SCHOOL

THE World War I action of Cockcroft at Ypres, the cracking of the Hindenburg Line at Cambrai, and successes of German armor in Poland and the Low Countries in World War II, all served to center the attention of military leaders on the importance of armor in modern warfare.

Cognizant of the need for a school where the teaching of armored tactics and developments could be focused, General Adna R. Chaffee, on July 27, 1940, directed the organization of the Armored School and Replacement Center at Fort Knox, Kentucky.

On its activation, The Armored School had as its nucleus the 7th Cavalry Brigade, Mechanized (Reinforced) school (which became the 1st Armored Division School in July 1940), and the tank section of The Infantry School.

With these elements, which had been in existence for years, The Armored School expanded concurrently with the growth of the Armored Force. The first students were received November 4, 1940, and although the annual output of the School was originally 8,000 officers and enlisted men, within two years 38,000 officers and enlisted men were trained yearly.

Expanding rapidly, the School became the largest of its kind in the world, with over 500 buildings and equipment evaluated at over $20,000,000 and encompassing in its reservation some 50,000 acres of land upon which are gunnery and driving ranges, as well as combat and demonstration areas.

By April 1946, The Armored School had trained 12,074 officers, 12,180 officer candidates, and 69,764 enlisted men, for a total of 94,018 students. Unit after unit, from the 1st Armored Division to the 20th Armored Division and the many separate tank battalions, all had in their organization alumni of The Armored School.

On the inactivation of the Tank Destroyer School in November 1945, The Armored School incorporated tank destroyer courses in its curriculum.

The Armored School today has three main divisions: the Administrative Division, consisting of The Commandant, his staff, and the Training Group, the latter being the housekeeping unit; The Armored School Troops, consisting of tactical units which furnish demonstration troop requirements for student classes; and the Academic Group, consisting of the academic departments and agencies.

The Academic Group operates under the guidance of the Assistant Commandant and is responsible for all instruction and student administration. The actual instruction of students is given by trained officer and enlisted instructors, a vast majority of whom have had armored combat experience on the battlefields. Each instructor is fully trained in the principles of teaching before he is given actual teaching duties.

Each academic course is designed to fill a particular need of armored units. They consist of specialized courses in various departments, and integrated courses whereby the student receives instruction in several categories. The integrated courses include: Officer Candidate School, which prepares officer candidates for their duties and responsibilities as officers with armored units; the Armored Officers Course, which prepares armored officers for their duties as company or battalion commanders and as members of the battalion, group or combat command staffs; and the Armored Noncommissioned Officers Courses, which prepares selected enlisted personnel for tactical and general administrative duties within the company.

Considered as special subjects are those integrated courses which have a duration of one month or less. Among these are: Professor of Military Science and Tactics, for the training of selected personnel for duty with university ROTC units; Prisoners of War, for orientation of returned officer prisoners of war on the present status of armor; National Guard Officers and Noncommissioned Officers, for training as instructors of National Guard Units. Other special courses are offered from time to time for the instruction of selected groups, and are highly specialized.

The academic departments which make up the Academic Group are: Communication, Full-Track, Wheeled-Vehicle, Weapons, Tactics, General Instruction, and Training Literature and Reproduction.

Communication Department

The Communication Department offers instruction for specialized communication courses and generalized instruction for the integrated courses. In officers' courses, the objective is to familiarize the student with the general principles involved, in order that he, as a commander of a unit, may have a working knowledge of the capabilities and limitations of his signal communication personnel and equipment. In the instruction given to officer candidates and noncommissioned officers, the objective is to familiarize them with their duties as platoon commanders, insofar as signal communications are concerned. In these courses, all essential elements of signal communication are covered with the emphasis needed placed on various phases, as: radio operation and voice

procedure, wire and visual communication, and the practical application of communication security and combined communications.

Whenever practicable, officers and enlisted men function in their respective capacities during practical field work in order to train them for coördinated teamwork within their organizations. Particular emphasis is placed upon training personnel to act as instructors when they return to their units.

Full-track Department

In the Full-Track Department the 1st and 2d echelons of the Army system of maintenance are taught to both officer and enlisted student personnel. The courses are composed of mechanical rather than engineering subjects with a view to standardizing the basic mechanical practices involved in the maintenance of the full-tracked vehicles employed by the various arms of the Army Ground Forces.

Courses taught in this department are designed to teach students to supervise properly the 1st and 2d echelons of maintenance that should be performed by the troops in their charge. Familiarization with the various basic types of tracked-vehicles and their characteristics, capabilities, and salient maintenance needs are taught, and "Before," "At Halt," and "After Operation," preventive maintenance practices are emphasized. Importance is placed on leadership and methods of instruction in order that the student can act as an instructor in his unit.

General Instruction Department

The General Instruction Department is divided into the Instructor Training, Map Reading and Field Engineering, Night Vision Testing and Training, and Administrative Subjects Divisions.

The Instructor Training Division teaches the "methods of instruction" which include the principles of learning, preparation and presentation of subject matter, test construction and evaluation, and practice teaching. This division also conducts a course in leadership, and trains all newly assigned instructors of the school.

The Map Reading and Field Engineering Division teaches map reading, aerial photograph interpretation, and pioneer engineering.

The Night Vision Testing and Training Division conducts classes in the theory of night vision and the practical application of this science.

The Administrative Subjects Division conducts training in company administration. The courses are comprehensive reviews of the administrative procedures within the company. They enable the students to understand more fully many administrative problems which arise within the company and to cope with these problems more effectively. Clerical courses for enlisted students are also given in this division, which include the study of typing and shorthand.

Tactics Department

The Tactics Department offers only phases of the integrated courses of the School curricula. Courses are divided in scope dependent upon the purpose of the course and experience of the student.

Instruction is given in combat intelligence; tactics and technique of light, medium, and heavy tanks armed with 75mm, 76mm, and 90mm guns; tactics and technique of small arms to include the cal. .50 machine gun; tactics and technique of the armored section, platoon, company, and battalion in all types of operations including their part in the Infantry-Artillery-Tank-Air team; scouting and patrolling; reconnaissance and security; orders and messages; organization of armored units; supply and evacuation; marches; tactical employment of units, alone and with other arms; air-ground liaison and coöperation; the evolution of tactics and the effect of modern means and methods thereon. In conjunction with School troops a large part of this instruction is carried into the field where the student "learns by doing."

Weapons Department

The Weapons Department provides instruction in the care, operation, mechanical functioning, marksmanship, and service firing of all weapons used by armored units. Officer students are trained to become qualified instructors in these subjects. They are provided with a comprehensive, direct fire tank gunnery course and familiarization with the latest tank weapons and tank indirect fire procedures. Enlisted students are trained to become qualified assistant instructors or armorers and artillery mechanics. Officer candidates are provided with instruction not only in technical data but also regarding their prospective duties as a company officer, relative to training tank crews in care and manipulation of weapons.

Wheeled-Vehicle Department

The Wheeled-Vehicle Department trains maintenance officers and enlisted automotive mechanics. Training includes a comprehensive review of the Army system of maintenance with detailed study relative to the 1st and 2d echelons of maintenance of wheeled- and half-track vehicles. Officers and enlisted men are trained in automotive mechanics, each for his particular type of duty regarding the supervision for correct operation, care, and preventive maintenance. In all of these courses basic instruction is given in the armored maintenance systems, principles of engine operation, fuel and electrical systems, chassis units and suspension systems, forms and records, inspections, and driver selection and training. The emphasis or elaboration of a particular subject is made dependent upon the type class being taught. Stress is placed on leadership and methods of instruction so that each student upon return to his unit may act as an instructor.

Training Literature and Reproduction Department

An integral, though comparatively inconspicuous branch of The Armored School is the Training Literature and Reproduction Department. Here skilled artists, draftsmen, photographers, linotype operators and printers perform the technical functions that are necessary to the production of a mass of instructional material.

A staff of experienced editors in this department review, edit, and rewrite lesson plans, field manuals, technical manuals, examinations, training schedules, and similar material. Here, all charts, maps, overlays, photostats, diagrams, and sketches used in Armored School instruction are produced. In the printing plant of the department three offset presses and five smaller platen and direct presses produce huge quantities of material for the School, as well as for Army Ground Forces and components of the Fifth Service Command.

Recently this department also assumed responsibility for the editing and administration of Army Extension Courses prepared by personnel of the School.

Training Group

The Training Group, part of the Administrative Division, has an important rôle in the smooth functioning of the School. It is an administrative and housekeeping organization and is responsible for the billeting, rationing, and administration of the enlisted personnel of the School. It also houses and rations both officer and enlisted students, and supervises the bachelor officers' quarters and messes operated for the assigned officer personnel of the School. The Training Group is composed of the Instructor Battalion, the Student Battalion, the Student Officer Company and the WAC Detachment.

Armored School Troops

The Armored School Troops consisted initially of a number of Table of Organization units and the Demonstration Regiment. These units were originally assigned to the School, placed under this headquarters and began to function with the dual mission of performing school assignments and carrying on unit training. Many of the units used by School troops have been completely trained and engaged in actual combat. Also many trained units were transferred to other continental stations, or in some cases, were inactivated and used as replacements. Troop requirements, ranging from a driver operator with a quarter-ton truck and radio, up to exercises involving three or four armored battalions, with supporting arms and services, have been requested for school demonstrations. These troops are used to illustrate the employment of all basic Ground Force arms: tanks, field artillery, tank destroyers, infantry, cavalry, and engineers. The culmination of classroom instruction is the practical work wherein the student "learns by doing." The officer candidate and officer students learn to drive armored vehicles on various types of terrain. Tactics are studied by observing actual troops on the ground. Details of arranging infantry-tank, tank-artillery, and infantry-engineer coöperation are worked out by the students, who take over command and staff positions and put their plans into effect on the ground. Using radio equipment organic to armored units, OPs are set up and manned by students studying staff procedure. The use of camouflage, the methods of mine-field laying and removal, and the use of screening smoke are observed under field conditions. In short, Armored School Troops take the instruction to the field.

Book Department

In addition to the aforementioned departments, the School also operates the Book Department, consisting of the Library and Book Shop. The shelves of the library hold a collection of 7,000 volumes, largely pertaining to military subjects and to the technical aspects of Army equipment. It also maintains a file on pertinent Field and Technical manuals, War Department circulars, and Army Regulations. The library obtains the latest books and subscribes to all the service periodicals and the New York *Times*, making it a source of reference material for assigned and student personnel of the School.

The Book Shop operates a main store and a branch store, which stock for sale those materials and supplies which are not items of issue but are aids for students, instructors, and assigned personnel in the performance of their duties. It also carries for sale War Department publications, nonmilitary textbooks, and Army Ground Forces approved School publications. It is prepared to secure, at the most reasonable cost, any text or publication desired by students or instructors.

Through this integrated network of departments, The Armored School has functioned, since its inception, as the training ground of American armor and armored personnel.

The postwar aim of The Armored School is to offer to its students the latest in armored developments and tactics, and the application of lessons learned in World War II.

With a life span of only five and one-half years, it must be admitted that The Armored School has accomplished educational procedures outstanding in military history. Successes of American Armor in World War II attest to the efficiency and well-founded principles taught at The Armored School.

Tanks, jeeps and other vehicles of the 9th Armored Division, U. S. First Army, make a brief stop in Carweiler, Germany, before pushing on to their next objective. 1945.

Men of the 11th Armored Division fire from behind one of the division's tanks on the town of Kepple, Austria.

U.S. ARMORED DIVISIONS IN WORLD WAR II

(To be continued)

Signal Corps Photos

A tank of the 10th Armored Division, of the Seventh Army, enters Rosswalden, Germany. Civilian at right prepares to put water on her home, set afire by other tanks.

A combat command of the 12th Armored Division, the 43d Tank Battalion's Company B, Seventh Army, drives toward Nurnberg, birthplace of Nazism. Here the column waits by a woods for the completion of a near-by by-pass.

Book Reviews

TOP SECRET. By Ralph Ingersoll. Harcourt Brace and Company. $3.00.

After seeing experience in North Africa, Ralph Ingersoll went to England in the spring of 1943, as a staff captain in the infant American Army. From then on he served in the strategic and tactical planning sections of a number of senior commands, rising to the rank of lieutenant colonel. For some months before and immediately after the invasion he was an American observer attached to General Sir Bernard Montgomery's staff. From the battle of St. Lô on, he was in the plans section of General Omar N. Bradley's field headquarters. Throughout the campaign in Europe he did liaison work between the staffs of Bradley, Montgomery, and Eisenhower. He took part in the D-day assault in Normandy; other times he was attached to combat commands where he was able to observe the results of high strategy at the fighting front.

And from this experience, he draws his uncensored, inside story of how the generals planned and ran the invasion of Germany. Beginning in London a year before D-day with the conflict between the Americans and British over whether or not there should be an invasion of France, it is a behind the scenes narrative of the great events of our war in Europe as seen from the map rooms of the planners and trailer headquarters of the top field commanders.

Falling in with the trend toward telling the story of each top-flight General in his turn, Ingersoll has made General Omar Bradley the hero of his story. As has been the case with the other writers and their heroes, the author contends that Bradley was perhaps most responsible for Allied victory. This time alone will tell, but the important thing is, the Public is offered an inside view into the life of one of the ablest commanders in American history. In addition, *Top Secret* is a record of personal and national conflicts behind the front of Anglo-American collaboration, written with neither political axe to grind nor official record to uphold. It is a book you will surely want to read and own.

* * *

CORAL COMES HIGH. By Captain George P. Hunt, USMCR. Harper & Brothers. $2.00.

Within the limited pages of Capt. Hunt's story is an itemized bill of what one bleak patch of coral in the middle of the Pacific costs, and this is a minor item in the "blood, sweat, and tears," shed during this war. 48 hours of combat on Peleliu—48 pages of personal glimpses of the heroism, bravery, and self-sacrifice of Capt. Hunt's company which tell of the heavy casualties sustained in a seemingly hopeless position.

This story is told in a simple style that somehow makes its dynamic happenings stick in the mind, and, as is typical of brave men, the author tells in matter-of-fact language of the casualties along the beach sector: "Another explosion and whine—hope that one got a couple of 'em—I had seen Bennett very solemnly sitting in a shell hole looking at a picture while bullets were clipping the brush around him.

'What are you doin'?' I asked him.

'Lookin' at my wife's picture. Wonderin' if I'll ever see her again.'"

George P. Hunt served in the 1st Marine Division in the South Pacific and was decorated with the Silver Star and the Navy Cross, the latter for his part in the action described in this book. A graduate of Amherst College he is now a writer on the staff of *Fortune* Magazine.

This is the story of fighting men told by a fighting man. After reading it you will agree that "coral comes high."

* * *

WORLD WAR II: A CONCISE HISTORY. By Roger W. Shugg and Major H. A. DeWeerd. Infantry Journal Press. $3.00.

World War II: A Concise History is offered to Americans as a brief but complete history of the war to VJ Day. Students of history as well as the general public will welcome this book as an aid to completing their mental picture of what happened in this the greatest war of all time. It is a complete battle-by-battle account, largely military but not technical in language. Though it is not a book to be read for pleasure, it is excellent for study and reference.

* * *

AND ANOTHER THING. By Howard Spring. Harper & Brothers. $2.50.

"What an unaccountable thing human memory is! It is stuffed with unrelated odds and ends, matters of no significance or value, and these will not depart to make room for all the great moments, the vital experiences, as we choose to consider them, that we would gladly remember." And thus Howard Spring opens his latest book, aptly described as "random reflections." How else could one describe this work that deals with autobiography, reminiscence, literary criticism, theology and philosophy, war and pacifism, passing from one thought to another just as the human mind will when given free rein to wander. This original purpose of the author, to let the mind wander from thought to thought drawing from each its true essence, is accomplished in a clear, simple style with a beauty that sometimes haunts the mind.

The title of this book is, indeed, one to capture the imagination and the reader will not be disappointed in the perusal of this new and unique writing.

One of the Most Important Stories of World War II

PATTON and HIS THIRD ARMY

By

COLONEL BRENTON G. WALLACE

The biography of an army. The story of one of the most amazing feats of history.

$3.00

PATTON: The Fighting Man

By

WILLIAM BANCROFT MELLOR

The story of the most colorful general of World War II. A biography that every cavalryman will want to own.

$3.00

MY THREE YEARS WITH EISENHOWER. By Captain Harry C. Butcher, USNR. Simon and Schuster. $5.00.

General Eisenhower's Naval Aide, Captain Harry Butcher, kept a diary which is more than one man's personal diary; it could have been written only by a man who lived with Eisenhower day and night and acted as personal friend and confidant. In his introduction, Captain Butcher writes, "I wish to make it clear to the reader that this is my responsibility and not General Eisenhower's. Yet I like to think that, although I wrote this book, General Eisenhower lived it."

This book is a new kind of history written in the midst of mighty happenings as they were occurring. It will, no doubt, become a source book for historians in years to come, because it is an authentic account of the North African invasion, the cross-channel invasion, and the final disintegration of the German armed force. Yet it is more than history; it is a backstage account of a great drama, revealing intense human interest, grand strategy, and intimate glimpses of key members of the Allied family.

Of the author's style, it may be said that it is simple, as may be expected of a diary, yet it never fails to hold the reader's interest. The book contains authentic pictures and maps; it is well indexed; its 900 pages are packed with interesting, epoch-making events and delightfully human trivia; in short, it is well worth the reader's time, a welcome addition to any library, and a book that the military man of today will surely want to own.

* * *

BASTOGNE: THE FIRST EIGHT DAYS. By Colonel S. L. A. Marshall, assisted by Captain John G. Westover and Lieutenant A. Joseph Webber. Infantry Journal Press. $3.00.

Many stories of combat told by a man who "was there" when it happened, have been written, and still another of these is Colonel Marshall's on-the-spot story of one of the most famous and most bitter fights of World War II in the European Theater. His story is based on material gathered firsthand by an Army historical unit, the men of which were actually present in Bastogne during the fighting. To lend clarity and interest to the text, the book is illustrated by ten drawings, sketched from life, 24 maps, and 32 pages of pictures. In addition the end papers are a reproduction of the famous "Christmas Overlay"—a kind of military map which carried simultaneously information of the enemy and Christmas Greetings to the defenders of Bastogne.

Of *Bastogne, The New York Times Herald* says: "What Colonel Marshall has set down is the story of how armor, artillery and infantry of many different units—the famous 101st Airborne Division was by no means alone—were welded into a fighting team for the defense of Bastogne. It is the story of how this team, with skill, determination and confidence, stood its ground and did a difficult job in some of the darkest days of the war. Colonel Marshall's book should be excellent source material for historians, but it is rough going for the general reader."

STRATEGY OF THE CIVIL WAR. By Barron Deaderick. Military Service Publishing Co. $2.50.

Barron Deaderick, born near Memphis, Tennessee at the close of the Civil War, early in life became interested in a study of history and military campaigns. He was long associated with the Sons of Confederate Veterans as Historian-in-Chief and thus enjoyed ample opportunity to study and analyze the basic principles of strategy employed by the Confederate and Union commanders. This abundant source material for a study of the principles of war has been liberally drawn upon in *The Strategy of the Civil War.*

The author's object is to analyze and compare the application made by both Union and Confederate commanders of the basic principles of strategy. To attain this object, he deals with each battle and its officers in such a way that both military and lay readers will find it interesting. Added interest is furnished by his maps of the territory surrounding the battle grounds.

In short, here is a brief, concise and interesting study of the Civil War.

* * *

SCIENCE YEAR BOOK OF 1946. Edited by J. D. Ratcliff. Doubleday & Company, Inc. $2.50.

Here is the fifth in Mr. Ratcliff's series of Science Year Books providing an intriguing compilation of the best in scientific articles of the year. Divided into four parts, Physics and Chemistry, Medicine, Agriculture, and Aviation and other Sciences, the book contains such titles as "The Atomic Age Opens," "Chemical Magic," "Atomic Power," "The Immediate Future," "Cancer: Notes of Hope," "Radio Telephones for Everyone," and "Long-Range Weather Forecasting" and many more. In addition Mr. Ratcliff's introduction covers scientific advances not discussed elsewhere in the book.

Here are the scientific marvels of the year summed up in one interesting and intriguing volume for the lay reader, which with the previous volumes, will constitute a valuable reference library.

* * *

LANDING OPERATIONS FROM GRECIAN DAYS TO 1945. By Dr. Alfred Vagts. Military Service Publishing Company. $5.00.

This book covers the entire history of landing operations from the earliest recorded ventures of the Greeks to 1945. World War II produced the greatest series of landing operations the world has ever seen. Doctor Vagts analyzes all phases of the tremendous problem and correlates the lessons provided with the history-making operations of the war waged by the Allies and the Axis.

To those interested in military strategy and landing operations in particular, the title speaks for itself. The story of landing operations from beginning to end is set down in one complete and interesting volume.

A Basic Manual of Military Small Arms

By W. H. B. SMITH

How to load, operate and strip small arms of every nation.

This book is a combat tool as important as any of the weapons it describes and pictures.

$5.00

Articles of War Annotated

By LEE S. TILLOSTAN

Fourth revised edition

A clear, concise guide to understanding the Articles of War.

$2.50

A new book by
PIERRE van PASSEN

Earth Could Be Fair

The chronicle of a little town in Holland that becomes the eternal story of all mankind, permeated by van Passen's prophetic hope for a new and fairer world.

$3.75

Wrath in Burma

By FRED ELDRIDGE

The uncensored story of General Stilwell and international maneuvers in the Far East.

$3.00

HARD POUNDING. By Lt. Col. G. D. W. Court, M.C., Royal Artillery. U. S. Field Artillery Association. $2.50.

Here is a book dealing with the tactics and technique of antitank warfare. It discusses the theory of fighting tanks, reviews the antitank tactical and technical developments from World War I through World War II, continues with the tactics of tank destroyers and antitank guns, and, finally, summarizes tank destroyer and antitank organization. It contains three appendices dealing with German, Russian, and Japanese antitank tactics and a fourth devoted to Infantry antitank training. Also of interest are more than seventy illustrations pointing up the important tactical and technical points of tank "killing."

This is a book that will not only make interesting reading for the military-minded man but will also be treasured as a valuable reference book.

* * *

AMERICA IS IN THE HEART. By Carlos Bulosan. Harcourt, Brace and Company. $3.00.

Carlos Bulosan had dreamed since early childhood, when his older brother came home from serving with the American army in World War I, of the day when he would leave his native village of Binalonan, on the island of Luzon, and go to the shining land of America. In realizing his dream Carlos meets with bitter disillusionment and betrayal, yet holds his faith in America. Because he believed so stubbornly in America, he has finally found her—"in the heart."

The book is interesting from its beginning in Binalonan where the Bulosan family struggled to eke out an existence from the soil and educate Macario, an older brother of Carlos; through the struggles and disappointments of the young immigrant in America; to its end when Carlos realizes success with his pen. This is a sometimes tragic but always brave story written with the oblique humor and tenderness which marked his former book, *The Laughter of My Father.*

* * *

ROBERT E. LEE IN TEXAS. Carl Coke Rister. University of Oklahoma Press. $2.50.

Much has been written about the great Confederate General, Robert E. Lee, but Carl Coke Rister introduces a little known phase of his career—his service in Texas during the turbulent years preceding the Civil War. In reading this book, one goes with Lee to his lonely border posts and sees through his eyes the raw life of the frontier sharing with him the hazardous chases for Mexican bandits and renegade Indians. Lee worked with, and for the most part commanded, the famous Second Cavalry; and there is no doubt that his Texas experience served him well when, in 1861, he returned to Washington prepared to assume the rôle of the South's peerless leader.

This is a very welcome addition to the writings concerning General Robert E. Lee.

I SEE THE PHILIPPINES RISE. By Carlos P. Romulo. Doubleday & Co., Inc. $2.75.

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